HYDRAULIC JACKS
AND
PRESSURE PUMPS

Catalogue No. 16

RICHARD DUDGEON
Broome and Columbia Streets
NEW YORK CITY

Hydraulic Jacks
and
Pressure Pumps

CATALOGUE No. 16

1922

Established 1850

RICHARD DUDGEON

Original Inventor, Patentee and Manufacturer of the Hydraulic Jack, Hydraulic Punch and Roller Tube Expander

Broome and Columbia Streets
NEW YORK CITY

CABLE ADDRESS: DUDGEON, NEW YORK

Catalogues and Booklets

CATALOGUE No. 16 supersedes Catalogue No. 13, now out of print.

Catalogues of the latest edition should be kept on hand, and old catalogues should be destroyed.

The following booklets and catalogues are now at hand, and a copy of any one of them will be sent to any address on application:

Catalogue No. 9, printed in Spanish.

Booklet No. 10, containing detailed instructions for the use of hydraulic jacks.

Catalogue No. 11, printed in French.

Booklet No. 12, a vest-pocket reference book, giving engineering information and directions for the repair and use of hydraulic jacks.

Catalogue No. 16, which is this book.

As figures 1 to 504 have been shown in other catalogues, to prevent possible confusion the figures in this catalogue will be numbered from 505.

NOTE—As new forms or types of jacks, pumps, and other hydraulic appliances are continually being made, of which descriptive circulars will be printed, it is suggested that those interested send their names to the address below, and as these circulars are issued from time to time copies will be mailed to them.

RICHARD DUDGEON
24 COLUMBIA STREET, NEW YORK

Announcement

THE Factory and Offices of Richard Dudgeon have been located at Broome and Columbia Streets, Borough of Manhattan, City of New York, for over sixty years. They are one block north of Grand Street, six short blocks from the East River and six short blocks east of the entrance to the Williamsburg Bridge, twenty-three short blocks (about one and one-eighth miles) east of Broadway, and are but one block from both the Grand and the Delancy Street cross-town cars. They may be reached from the Spring Street subway station by the Delancy Street cars, from the Grand Street stations of the Second, Third and Sixth Avenue elevated railroads by the Grand Street cars, and from the Second, Third, Fourth and Sixth Avenue, or the Broadway cars by the Grand Street cars marked Grand Street Ferry. They are opposite the well-known printing press works of Robert Hoe & Co.

The Hydraulic Jack

THE hydraulic jack is a lifting apparatus operated by the pressure of a liquid under the action of a force pump. Its power depends on the law of hydrostatics that any pressure upon a body of water is distributed equally in all directions throughout the whole mass, whatever its shape. In the hydraulic jack, the pressure of a piston upon a body of water in a cylinder of small area is distributed through an opening to a piston of larger area, the statical force being thus multiplied in the direct ratio of the areas of the pistons. Thus, if the diameter of the pump piston is one inch and the diameter of the lifting piston, or ram, is four inches, the area of the ram will be sixteen times that of the pump piston; and if a load of three tons is applied to the pump piston by means of the lever, the ram will exert an upward statical force of 48 tons.

R. DUDGEON'S HYDRAULIC JACK WITH SINGLE PUMP

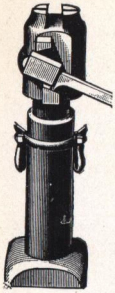


Fig. 505 Plain Jack
For use in presses, or where there is a firm foundation or support.

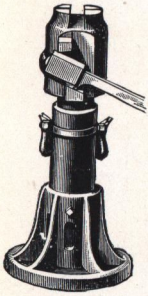


Fig. 506 Base Jack
For railroad work, or where a broad base, insuring stability, is required.

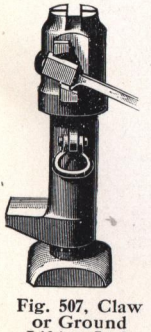


Fig. 507, Claw or Ground Lifting Jack
For machine shops, and for work that will not permit the head to be placed under the load.

No.	Lift Tons	Run Out In.	Height Inches	Size Bottom Inches	Weight Pounds	Price	Code
1	4	12	24	4 sq.	46	$60	Abbot
3	7	12	25	4¼sq.	64	70	Actor
4	7	18	32	4½sq.	72	73	Adept
6	10	12	25	6 sq.	80	80	After
7	10	18	32	6 sq.	98	95	Agate
8	10	24	39	6 sq.	110	110	Ahead
9	15	12	26	6½sq.	102	100	Aisle
10	15	18	32	6½sq.	120	125	Alarm
11	15	24	39	6½sq.	140	150	Amity
12	20	12	26	7 sq.	127	120	Angle
13	20	18	33	7 sq.	155	145	Aorta
14	20	24	39	7 sq.	180	170	Apart
15	30	9	22	8 rd.	146	150	Ardor
16	30	12	26	8 rd.	194	175	Aspen
17	30	18	33	8 rd.	260	210	Abode
19	40	12	27	9 rd.	280	210	Audit
20	40	18	34	9 rd.	320	250	Avail

No.	Lift Tons	Run Out In.	Height Inches	Diameter Base Inches	Weight Pounds	Price	Code
26	4	12	23	9½	61	$60	Brake
29	7	12	25	10	82	80	Bread
30	7	18	31	10	100	85	Badge
32	10	12	25	11	109	95	Baker
33	10	18	31	11	125	110	Baron
35	10	24	39	11	145	125	Basin
36	15	12	25	12	135	125	Beach
37	15	18	32	12	158	150	Belay
38	15	24	39	12	176	175	Bench
39	20	12	26	13	169	150	Berth
40	20	18	33	13	198	175	Beryl
41	20	24	39	13	228	200	Betel
43	30	9	22	14	210	170	Black
44	30	12	26	14	259	200	Brown
45	30	18	33	14	300	235	Brunt
47	40	12	27	14½	320	240	Broad
48	40	18	33	14½	360	280	Bound
50	50	12	28	15½	365	260	Braid
51	50	18	34	15½	410	310	Brook

No.	Lift Tons	Run Out In.	Height Inches	Size Bottom Inches	Weight Pounds	Price	Code
55	4	12	24	4 sq.	64	$60	Cadet
58	7	12	25	4½sq.	90	85	Cairn
59	7	18	31	4½sq.	110	88	Calix
60	7	24	38	4½sq.	123	90	Camel
61	10	12	25	6 sq.	123	100	Canoe
62	10	18	32	6 sq.	144	120	Caret
63	10	24	39	6 sq.	170	145	Cargo
64	15	12	26	6½sq.	162	150	Carol
65	15	18	32	6½sq.	189	185	Chafe
66	20	12	26	7 sq.	207	200	Chain
67	20	18	33	7 sq.	245	240	Chalk
69	30	12	26	8 rd	310	250	Chant

Special lengths made to order at price of next longer size

Discounts.....

R. DUDGEON'S TRAVERSE JACK WITH SINGLE PUMP

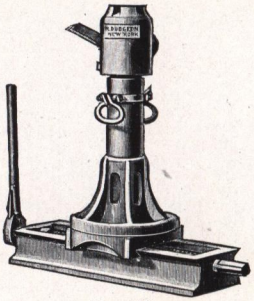


Fig. 508

No.	Tons	Run Out Inches	Height Inches	Weight Pounds	Price	Code
75	10	12	30	250	$150	Ideal
76	15	12	30	275	185	Idiom
77	20	12	31	310	225	Image
78	30	12	32	425	285	Impel

R. DUDGEON'S CAR BRASS JACK WITH SINGLE PUMP

Fig. 509

No.	Tons	Run Out Inches	Height Inches	Size of Bottom Inches	Weight Pounds	Price	Code
80	7	5	11	8¼ x 5¼	56	$75	Habit
81	10	5	11	9½ x 6½	60	90	Hoist
82	15	5	11	9½ x 6½	80	120	Hedge
83	20	5	11¾	10½ x 8	108	135	Helve

This jack is used by car inspectors for removing brasses; also by those requiring a jack of limited height. It is lowered by means of the hand wheel shown on top of the cistern.

Discounts.....

R. DUDGEON'S HORIZONTAL JACK WITH SINGLE PUMP

So-called, as they will run out as far horizontally as vertically. While standing about 5 inches less over all, they will lift the same distance as those on preceding pages A removable wrought-iron claw which comes nearer to the ground may be used. All working parts are within the cistern, protected from injury, while the valves are still easy of access.

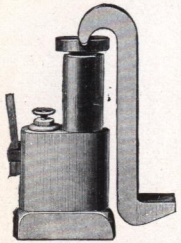


Fig. 510, Square Base

No.	Tons	Run Out Inches	Height Inches	Size of Square Base, Inches	Weight Pounds	Price	Code	No.	Price, with Claw Used with Square Base only	Code
85	7	12	20	9 x 5½	102	$80	Dance	100	$85	Dagger
86	7	18	26	9 x 5½	120	85	Debit	101	90	Damask
88	10	12	20	9½ x 7	135	95	Delta	103	105	Damson
89	10	18	26	9½ x 7	166	110	Delve	104	125	Dangle
90	10	24	32	9½ x 7	196	130	Demur	105	150	Dative
91	15	12	21	9½ x 7	150	125	Dense	106	150	Degree
92	15	18	26	9½ x 7	187	150	Digit	107	180	Deluge
93	15	24	32	9½ x 7	200	175	Ditch	108	215	Deputy
94	20	12	21	11 x 8½	197	150	Diver	109	185	Desert
95	20	18	27	11 x 8½	242	175	Dower	110	215	Design
96	20	24	33	11 x 8½	255	200	Draft	111	250	Dragon

SQUARE BASE HORIZONTAL JACK, WITH OR WITHOUT REMOVABLE WROUGHT-IRON CLAW

This style jack is used where there is a firm foundation, and is especially adapted for use horizontally, as there is no projecting round base to interfere with placing the jack on its side. Made in this style up to 20 tons capacity. Above 20 tons, the oval base style, Fig. 511, is used.

Discounts.....

R. DUDGEON'S HORIZONTAL JACK WITH SINGLE PUMP

Fig. 511, Round Base

No.	Tons	Run Out Inches	Height Inches	Size of Round Base Inches	Weight Pounds	Price	Code
115	7	12	20	11	102	$80	Earth
116	7	18	26	11	120	85	Eagle
118	10	12	20	12	135	95	Easel
119	10	18	26	12	166	110	Eaves
120	10	24	32	12	196	130	Ebony
121	15	12	21	12	150	125	Edict
122	15	18	26	12	187	150	Eider
123	15	24	32	12	200	175	Elbow
124	20	12	21	13½	197	150	Event
125	20	18	27	13½	242	175	Exel
126	20	24	33	13½	255	200	Exile

ROUND BASE HORIZONTAL JACK

This style jack is used for railroad work, and where a firm foundation is difficult to obtain; also where a long lift with a low height over all is required. Made up to and including 20 tons capacity.

Discounts.....

R. DUDGEON'S HORIZONTAL JACK WITH DOUBLE PUMP

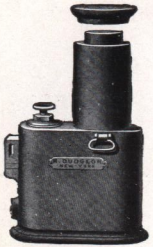


Fig. 512
Oval Base

No.	Tons	Run Out Inches	Height Inches	Size of Oval Base, Inches	Weight Pounds	Price	Code	No.	Price with Claw	Code
130	30	12	22	12½ x 9	234	$200	Fable	160	$240	Gable
131	30	18	28	12½ x 9	285	235	Facet	161	285	Gauge
133	40	12	22	13½ x 10	320	240	Fagot	164	290	Gaunt
134	40	18	28	13½ x 10	355	280	Fancy	165	340	Gauze
135	50	12	22	14 x 12	335	260	Farce	167	320	Gavel
137	50	18	28	14 x 12	380	310	Favor	168	380	Giant
138	60	9	17	14 x 12	320	250	Fence	169	310	Girth
139	60	12	20	14 x 12	350	275	Finch	170	340	Glade
140	60	18	26	14 x 12	410	350	Final	171		Gland
141	80	9	19	16 x 13	425	310	Flail	172		Glass
142	80	12	22	16 x 13	450	335	Feast	173		Gleam
143	80	18	28	16 x 13	525	385	Frame	174		Globe
144	100	9	19	17 x 14½	520	375	Found	175		Gnome
145	100	12	22	17 x 14½	570	400	Front	176		Gorge
146	100	18	28	17 x 14½	660	475	Friar			Grasp
147	125	9	19	18 x 16	535	425	Forum			
148	125	12	22	18 x 16	585	450	Forge			
149	125	18	28	18 x 16	685	525	Force			
150	150	12	23	20 x 18½	920	500	Flute			
151	150	18	29	20 x 18½	1120	575	Frank			
152	200	12	24	20 x 18½	1160	600	Fresh			
153	200	18	30	20 x 18½	1240	700	Frock			
154	250	12	25	20 x 20	1400	725	Fruit			
155	250	18	31	20 x 20	1650	850	Frost			

Claws for these sizes made to order.

OVAL BASE HORIZONTAL JACK

Horizontal jacks of 30 tons and over are made with this style base. Rams are supplied with either large head, as shown in Figs. 510 and 511, or with loose cap, as here shown, as preferred. When claws are used, the large head is necessary. Jacks of this style are provided with removable wrought-iron claws, when ordered. In this case, a support and guide for the lower end of the claw is cast on the cistern. (Not shown in cut.)

Discount.....

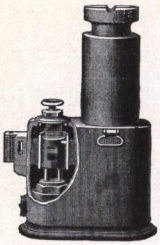


Fig. 513
30 Tons and Over

R. DUDGEON'S DOUBLE PUMP JACK

This double pump is especially adapted for large jacks, as the ram can be run out rapidly by using both pumps together until the strain is taken up; then the small pump only is used, giving the full power of the jack.

In ordering by telegraph, use the word, "Double" in connection with code word of jack required.

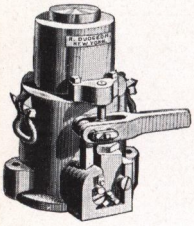


Fig. 514
Price Same as Horizontal Fig. 512

R. DUDGEON'S OUTSIDE PUMP JACK

This is the original design of this type of jack and has given satisfaction to its large number of users. It is the best jack of this type on the market.

R. DUDGEON'S HYDRAULIC PULLING JACK

These hydraulic pulling jacks are used for stretching rigging, testing chains and ropes, hoisting heavy weights, etc., and in engine rooms or other places where there is but little space.

These jacks differ from lifting jacks by their being extended when commencing to work, and then being pumped together. The force pump is attached to the side and is worked by a lever, the same as the hydraulic jack.

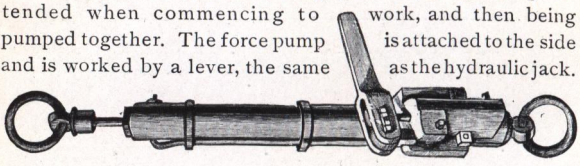


Fig. 515

SIZES AND PRICES

No.	To Stretch Two Feet and Pull—Tons	Price	Code
301	8	$200	Japan
302	10	240	Jaunt
303	15	300	Jetty
304	20	350	Jewel
305	30	450	Joist

Discounts.....

R. DUDGEON'S HYDROSTATIC WHEEL PRESS FOR 30-INCH WHEELS

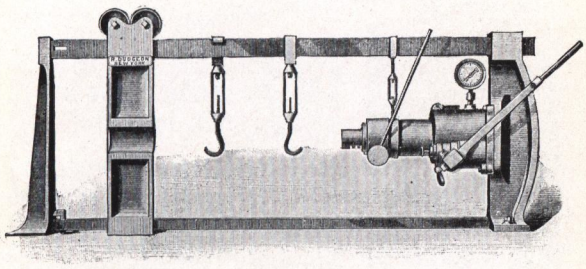


Fig. 516

The press shown by Fig. 516 is a hand-operated press, intended for pressing on or removing small car wheels. A rack and pinion is used to force the ram back into the cylinder after it has been extended. It may also be used to run the ram out to the work without the labor of pumping it out, the fluid with which the jack is charged filling the cylinder behind the ram by suction as it is withdrawn, and making it possible to commence pumping against pressure with the first stroke of the lever.

The gauge shows the total pressure exerted in tons, and the pressure to the square inch on the ram in pounds, on the same dial and by the same indicator, and is provided with a safety check valve to prevent injury to the gauge spring by shock caused by sudden release of pressure.

No.	Size, Tons	Price	Code
1	60	$340	Cedrium
2	80	420	Celarent
3	100	480	Celebrous
4	150	580	Celestine

Discounts.....

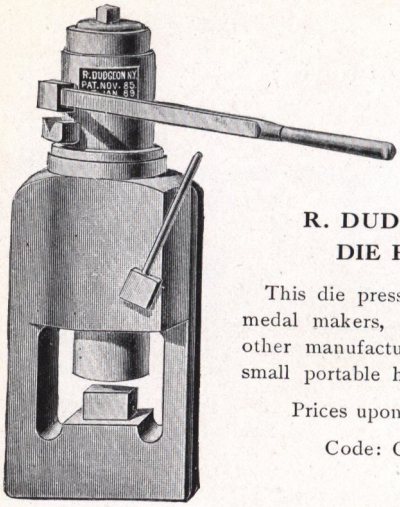


Fig. 517

R. DUDGEON'S DIE PRESS

This die press is intended for medal makers, die sinkers, and other manufacturers requiring a small portable hydrostatic press.

Prices upon application

Code: Cenobite

R. DUDGEON'S HYDRAULIC PRESS

In this type of press the lower platen and the cylinder are cast in one piece.

Prices upon application

Code: Cenotaph

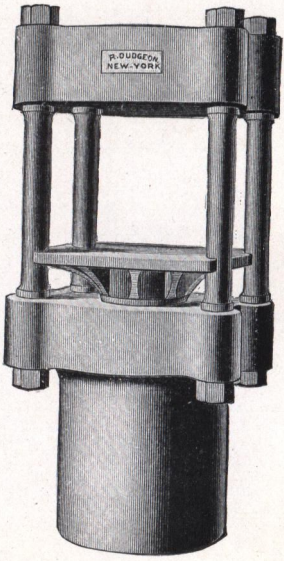


Fig. 518

R. DUDGEON'S DIRECT ACTING STEAM HAMMER

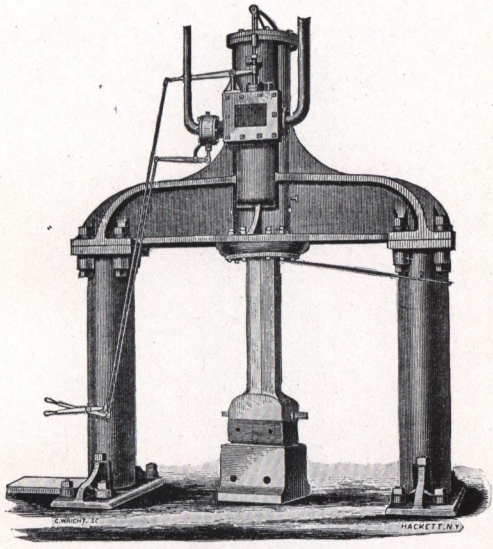


Fig. 519

Cylinder Inches	To Forge Inches Square	Stroke Inches	Blow	Price	Code
6	5	16	1200 pounds	$1050	Ceral
8	8	22	1½ tons	1250	Cerame
10	12	30	2¼ tons	2500	Cerasin
12	14	40	4 tons	3500	Cerasite
18	22	40	9 tons	4700	Ceratin
20	26	52	11 tons	8000	Cerbera

Except first size, these prices are exclusive of anvil blocks.

Discounts.....

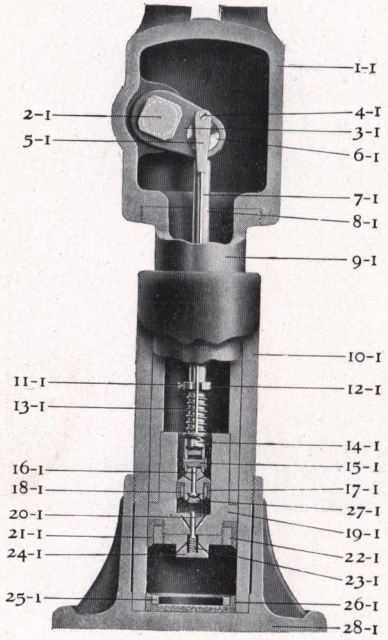


Fig. 520

Richard Dudgeon's Patent 1851

Circular No. 95

PRICES OF COMPONENT PARTS OF 1851 PATENT JACK, SHOWN BY CUT ON PAGE 14

1-1	Head	See list page 117	
2-1	Socket		$4.00
3-1	Arm		1.00
4-1	Lowering Wire Screw		.02
5-1	Lowering Wire Head		.50
6-1	Knuckle		.25
7-1	Lowering Wire		.25
8-1	Piston		1.00
9-1	Ram	See list page 115	
10-1	Cylinder	See list page 113	
11-1	Spring Collar Screw		.02
12-1	Spring Collar		.25
13-1	Piston Spring		.15
14-1	Sleeve		.25
15-1	Sleeve Crossbar		.10
16-1	Piston Valve		.10
17-1	Piston Packing Ring		.15
18-1	Cup Piston Packing		.10
19-1	Pump		3.00
20-1	Pump Valve		.10
21-1	Ram Packing	See list page 135	
22-1	Ram Packing Ring		.75
23-1	Valve Spring		.02
24-1	Ram Bonnet		.75
25-1	Bottom Packing Ring		.25
26-1	Bottom Packing	See list page 135	
27-1	Piston Bonnet		.15
28-1	Base	See list page 122	
29-1	Lever	See list page 136	
30-1	Socket Packing		.04
31-1	Arm Screw		.05
32-1	Base Screw		.05
33-1	Name Plate Rivets		.04
34-1	Knuckle Pin		.05
35-1	Fill Hole Screw		.15
36-1	Name Plate		.25
37-1	Handle Bolts	(Set)	.20
38-1	Straps	(Set)	1.00
39-1	Handles	(Set)	1.00

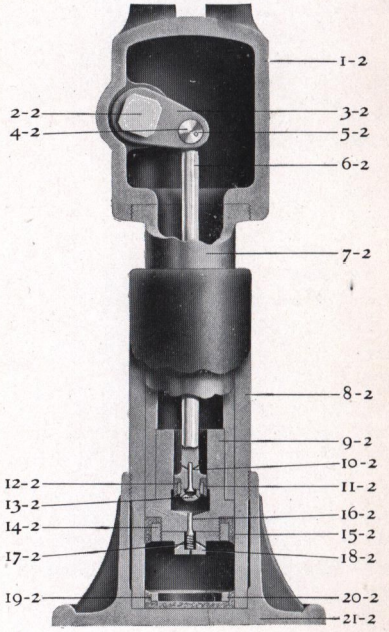


Fig. 521

Richard Dudgeon's Patent 1873

Circular No. 96

PRICES OF COMPONENT PARTS OF 1873 PATENT JACK, SHOWN BY CUT ON PAGE 16

1-2	Head	See list page 117	
2-2	Socket		$4.00
3-2	Arm		1.00
4-2	Knuckle		.25
5-2	Knuckle Pin		.05
6-2	Piston		1.00
7-2	Ram	See list page 115	
8-2	Cylinder	See list page 113	
9-2	Pump		3 00
10-2	Piston Valve		.10
11-2	Piston Packing Ring		.15
12-2	Cup Piston Packing		.10
13-2	Piston Bonnet		.15
14-2	Ram Packing Ring		.75
15-2	Ram Packing	See list page 135	
16-2	Pump Valve		.10
17-2	Valve Spring		.02
18-2	Pump Bonnet		.75
19-2	Bottom Packing	See list page 135	
20-2	Bottom Packing Ring		.25
21-2	Base	See list page 122	
22-2	Lever	See list page 136	
23-2	Socket Packing		.04
24-2	Arm Screw		.05
25-2	Base Screw		.05
26-2	Name Plate Rivets		.04
27-2	Fill Hole Screw		.15
28-2	Name Plate		.25
29-2	Handle Bolts	(Set)	.20
30-2	Straps	(Set)	1.00
31-2	Handles	(Set)	1.00

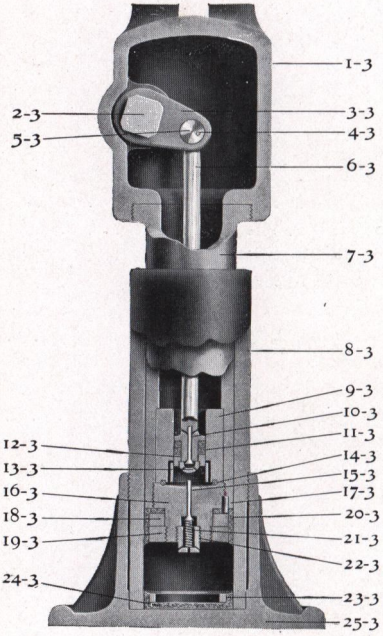


Fig. 522

Richard Dudgeon's Patent 1884

Circular No. 97

PRICES OF COMPONENT PARTS OF 1884 JACK SHOWN BY CUT ON PAGE 18

1-3	Head	See list page 117	
2-3	Socket		$4.00
3-3	Arm		1.00
4-3	Knuckle Pin		.05
5-3	Knuckle		.25
6-3	Piston		1.00
7-3	Ram	See list page 115	
8-3	Cylinder	See list page 113	
9-3	Pump		3.00
10-3	Piston Valve		.10
11-3	Hard Piston Packings	(Set)	.04
12-3	Piston Packing Ring		.15
13-3	Piston Valve Bonnet		.15
14-3	Pump Packing		.10
15-3	Pump Valve		.10
16-3	Ram Plug		1.50
17-3	Packing Pin		.02
18-3	Upper Ram Packing Ring		.25
19-3	Threaded Ram Packing Ring		.50
20-3	Ram Packing	See list page 135	
21-3	Valve Spring		.02
22-3	Valve Bonnet		.15
23-3	Bottom Packing Ring		.25
24-3	Bottom Packing	See list page 135	
25-3	Base	See list page 122	
26-3	Lever	See list page 136	
27-3	Socket Packing		.04
28-3	Arm Screw		.05
29-3	Base Screw		.05
30-3	Name Plate Rivets		.04
31-3	Fill Hole Screw		.15
32-3	Name Plate		.25
33-3	Handle Bolts	(Set)	.20
34-3	Straps	(Set)	1.00
35-3	Handles	(Set)	1 00

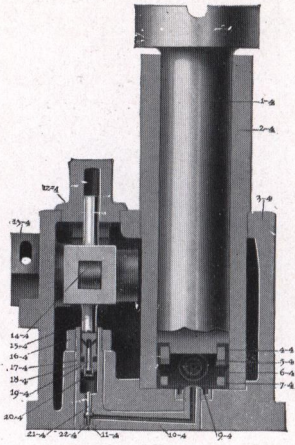


Fig. 523

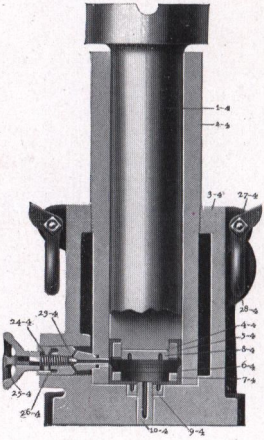


Fig. 524

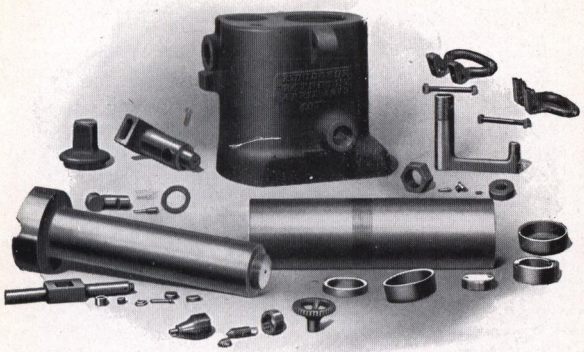


Fig. 525

PRICES OF COMPONENT PARTS OF JACKS SHOWN IN FIGS. 523, 524 AND 525 PAGES 20 AND 21

1-4	Ram	Price according to size
2-4	Cylinder	Price according to size
3-4	Cistern	Price according to size
4-4	Ram Packing Ring	$1.00
5-4	Ram Packing	Price according to size
6-4	Bottom Packing	Price according to size
7-4	Bottom Packing Ring	.25
8-4	Ram Packing Plate	1.00
9-4	Pump Small Nut	.25
10-4	Pump	Prices according to size
11-4	Pump Bonnet	.15
12-4	Cistern Cap	1.00
13-4	Socket	4.00
14-4	Knuckle	1.00
15-4	Piston	3.00
16-4	Pump Nut	.50
17-4	Piston Packings	.04
18-4	Piston Valve	.10
19-4	Piston Packing Rings	.15
20-4	Piston Bonnet	.15
21-4	Bottom Valve	.10
22-4	Valve Spring	.02
23-4	Lowering Valve Nut	1.00
24-4	Lowering Valve	.50
25-4	Lowering Valve Wheel	.75
26-4	Lowering Valve Bonnet	.50
27-4	Handle Bolts	.20
28-4	Handles	1.00
29-4	Socket Packing	.04
30-4	Knuckle Pin	.05
31-4	Fill Hole Valve	.15
32-4	Piston Collar	.15

THE UNIVERSAL JACK

The following pages give particulars of the new Universal jack, which embodies features never before used in hydraulic jacks, and all of which have been suggested by many years' experience. It represents the highest type of efficiency and reliability, and is claimed to be as nearly perfect as materials of construction will allow. This jack is designed to be readily taken apart and reassembled; all parts are interchangeable, and repair parts may be easily replaced by anyone at small cost. This feature especially commends it, as it is not necessary to discard a group of parts when one part requires replacement, as in some makes of jacks.

It has double pumps, so that if the load is light, or if the ram must be extended some distance before the strain commences, the two pumps can be used together until the strain becomes excessive, when one pump is thrown out by a turn of the handle. Reversing the operation throws both pumps into service again. This jack can be operated either vertically or horizontally, and with the lever working at any angle.

This jack may be lowered either by the lever or by the valve handle, and it can be furnished upon request to lower by either method alone. It requires but one pressure valve for both pumping and lowering. It neither requires an additional pressure valve, or valves, on account of its double pump (which has heretofore been the case), nor does it require an additional pressure valve (which has also heretofore been the case) for lowering.

This jack is unique in that the valve handle always shows the position of the valves; it can turn only in a half circle in either releasing the auxiliary pump or lowering, and the operator always knows whether one pump, two pumps, or the lowering device is in use.

This jack is lowered by the operator's pressing all the valves from their seats by the lever or valve handle, as he may desire, since all the valves are combined in a single valve chamber in a superimposed position, and all are forced off their seats together. The superimposed valves and pistons are new and desirable features, as any valve or either piston may fail and the jack continue in operation to its maximum capacity.

DETAILED DESCRIPTION OF THE PARTS OF THE UNIVERSAL DOUBLE PUMP JACK

As the new features of this jack require new parts, it may be well to describe them in detail.

Fig. 526

THE CAM, CAM SHAFT AND VALVE HANDLE

The cam, cam shaft and valve handle (Fig. 526) are cut from bar steel, and the cam is hardened to resist wear. Only one side of the cam is used at a time so that it may be reversed when worn

THE PUSH TUBE

The push tube (Fig. 527) serves two purposes. It is used to both throw out the auxiliary pump and to force the valves from their seats in order to lower or to clear the valve seats Inasmuch as the valve bore and the cam are off center, a

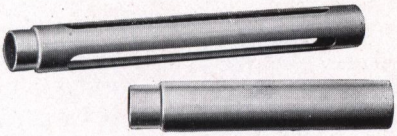


Fig. 527

tube is most suitable for this purpose. It is a section of boiler tube with one end swaged to provide a seat for the spring and a contact for the valve, and may be slotted as shown to decrease weight and displacement, if desired. The upper end is hardened to resist the wear of the cam.

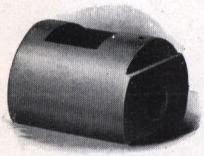


Fig. 528

THE PISTON HEAD

The piston head is made from bar steel, machined cold, and is case-hardened. It is circular in form and works between guides. It is shown by Fig. 528.

THE LEVER ARM

The arm is a solid steel drop forging, and is shown by Fig. 529.

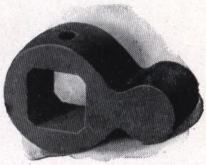


Fig. 529

THE VALVES

The valves are shown by Fig. 530. These valves are the same shape as has been used for many years, but instead of being made of hard brass they are made of tool steel and

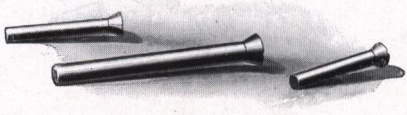


Fig. 530

hardened and coated with nickel to prevent rust and corrosion This is considered to be the best jack valve yet used.

THE VALVE SEAT

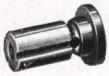


Fig. 531

The valve seat is shown by Fig. 531. This is of steel and is hardened.

Fig. 532

THE AIR VALVE

Fig. 532 shows the type of air valve used in these jacks. This valve permits the escape of entrapped air, but prevents the loss of the fluid.

THE PUMP AND PISTONS

Fig. 533 shows the pump and pistons used in the Universal double pump jack of the so-called vertical type.

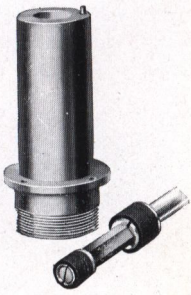


Fig. 533

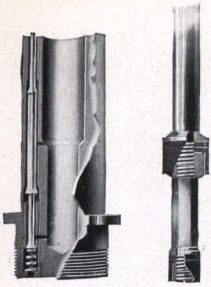


Fig. 534

THE PUMP AND PISTONS IN SECTION

The sectional view given in Fig. 534 clearly shows the distinctive features of the pump with its superimposed valves and pistons. The upper valves are shown unseated because of their weight. This arrangement of the valves and pistons greatly reduces the necessary number of parts.

PARTS OF DOUBLE PUMP JACKS COMPARED

The view (Fig. 535) shows the parts of the new jack in comparison with the similar parts in the old form of double pump jack. The small group at the lower left corner of cut

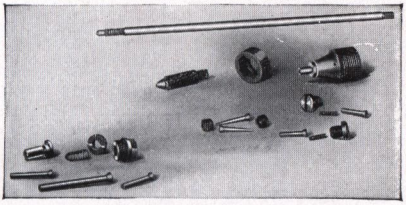


Fig. 535

shows the parts in the new type and the large group the parts in the old, both to the same scale.

THE PUMP'S ADJUSTMENT

The pump of this jack may be adjusted so that the ram may be fully extended horizontally, and a feature peculiar to this jack is that the pump can be so located that it will not become unsubmerged when the jack is placed in any position. As the valve bore is off center, and as the pump can be located in the ram so that the valve bore is on the lower side, the ram can be extended full length horizontally as well as vertically. The head is screwed on the ram, but as it is impossible to insure the head's being always located at the same angle to the ram, an adjustment is given to the pump by means of four equidistant holes in the pump collar, as shown in cut, allowing an adjustment of the valve bore to

within 45 degrees of the lever. Ordinarily when a jack is used horizontally the throw plane of the lever is vertical; but if for any reason this is impossible, the valve bore of the pump may be located in respect to the ram so as to run the ram out horizontally to its full length with the lever working at any angle, by turning the pump so that the valve chamber will be on the under side.

ACCESSIBILITY OF THE INTERIOR PARTS

The accessibility of the interior parts is another distinctive feature of this jack. The valves are reached by removing the ram and unscrewing the bonnet, when the valves with the removable seat will drop out. The piston packings are reached by unscrewing a plate in the head and lifting the piston through the opening. This is a very desirable advantage in doing away with the necessity of unscrewing the head from the ram to reach the piston packing and valve.

DISTINCTIVE ADVANTAGES

The following is a summary of advantages peculiar to this jack:

1. It is the only jack of the vertical type with a double pump.
2. It is the only double pump jack with but a single pressure valve.
3. It is the only double pump jack with but three valves in all.
4. It is the only jack, having but one pressure valve, which lowers by means of an independent lowering device.
5. It is the only jack lowering by means of both the lever and the valve handle.
6. It is the only jack in which the position of the valves is indicated by means of the lowering device.
7. It is the only jack that can be used horizontally with the lever working at any angle.
8. It is the only jack with superimposed valves and pistons.
9. It is the only jack provided with valves that will perform each other's work in case of necessity.
10. It is the only jack with pistons that will perform each other's work in case of necessity.
11. It is the only jack in which the pump may be used while the valves are open.
12. It is the only jack giving access to the valves by the removal of one bonnet.

DIRECTIONS FOR USING UNIVERSAL HYDRAULIC JACKS

Those accustomed to the use of hydraulic jacks will find the directions in this section all that are necessary to properly understand and operate the Universal Jack.

When both pumps are required, turn the valve handle to the left to the position marked "2 Pumps;" when one pump only is required, turn it straight downward to the position marked "1 Pump." To lower the jack, turn the valve handle to the right as far as required, or use the lever in the ordinary manner. To remove an obstruction preventing the proper seating of a valve, or to release a valve which has stuck to its seat, depress the valves by turning the handle to the right. This does away with the troublesome striking or hammering necessary to jar the piston valve loose in the older types of jacks, and in all jacks in which a valve is located in the piston.

Detailed directions for the use and maintenance of this type of jack follow:

GENERAL DIRECTIONS FOR USE AND MAINTENANCE

To those unaccustomed to the use of hydraulic jacks, the following directions will be valuable. All hydraulic jacks are tested, filled, and in working condition when shipped from the factory. They are so designed that one man of medium weight upon the lever furnished with the jack will exert the full rated lift of the jack. This, however, applies to the head of the ram and not to the claw, as it is obvious that the maximum load cannot be lifted by the claw to the full run-out of the jack, owing to the tendency of the ram of the jack to bend because the load is then at one side of the center.

TESTING JACKS BEFORE SHIPMENT

After assembling, all jacks are carefully tested and inspected, and if sent to a storeroom are again carefully tested and examined before shipment. In addition to this, they are required to stand a number of hours under pressure and without failure in order to set up the packings.

FILLING HYDRAULIC JACKS

When shipped, the jacks are filled with a solution of grain alcohol, one part, and pure water, two parts. This is the mixture recommended for use in hydraulic jacks. Many other liquids have been used, but it appears, from careful observation, that the solution recommended is most suitable for all purposes, for six different requirements are essential to the choice of the proper liquid.

1. The liquid must not freeze in cold weather.

2. It must not rust or corrode the polished surfaces of the cylinder and pump, in which event the packings will be cut.

3. It must not harden or destroy the leather packings.

4. It must not soften the leather packings.

5. It must not crystallize or encrust the valves and valve seats.

6. It must not gum or clog the valves, valve seats and passages.

Wood alcohol, denatured alcohol, kerosene, oils, glycerine, and water should not be used. Water is dangerous on account of its liability to freeze and to rust the jack when not in use. Kerosene destroys the packings, and wood alcohol both destroys the packings and corrodes the metal surfaces. Denatured alcohol corrodes the metal surfaces on account of its containing wood alcohol, but not so seriously as wood alcohol alone. Heavy oils and glycerine soften the packings and gum and clog the valve ports. Care should be used in having this liquid free from dirt and grit, in order not to injure the polished surfaces of the cylinder and pump or cut the valves and packings. The jack may be filled either through the small opening closed by the air valve or through the larger opening over the piston. The latter opening is the more convenient if a funnel is not at hand.

THE RAM MUST BE DOWN WHEN A JACK IS FILLED

The ram should be quite down when the jack is filled, to prevent using more liquid than the reservoir will hold when the ram is run down. If a jack is filled full when the ram is run out and the cylinder under the ram is also full, the fill hole plug should not be replaced until the surplus fluid is allowed to escape through the opening, for otherwise the reservoir may be burst if the ram be lowered rapidly while under a

load. The reservoir need never be entirely filled as it is not only sufficiently large to furnish enough liquid to run the ram up to its full extent, but has an ample supply to provide against loss by evaporation or leakage.

TO CLEAN HYDRAULIC JACKS

A jack should be occasionally cleaned out and refilled, as the fluid sometimes becomes thick, and prevents the jack from working properly. In cleaning, care should be taken to prevent the introduction of foreign matter that would be liable to injure the jack. Usually all that is necessary in cleaning a jack is to strain and replace the liquid with which it has been charged.

AIR VENT FROM RESERVOIR

An airhole is provided in the reservoir to permit the escape of the accumulated air when the ram has been run out, which would otherwise be trapped in the jack. Care should be taken to keep this passage free from dirt so that the air will always have a chance to escape. This passage is closed with a ball-valve to prevent leakage of liquid when the jack is lying in such a position that the fluid would otherwise escape.

KEEPING RAM DOWN IN CYLINDER WHEN JACK IS NOT IN USE

It is important to always keep the ram quite down within the cylinder when not in use. This prevents the rusting of the ram and the drying up of the ram packing.

TO OPERATE HYDRAULIC JACKS

In using a jack, especially one of large capacity, a matter of the first importance is to provide a solid and level support or foundation for the jack and to see that the jack is properly placed upon it. The foundation should never be permitted to spring or sag, for there is danger not only that the load may be dropped but that the jack may be broken. In all cases where jacks are provided with attached cisterns care must be taken that the portion of the jack below the cylinder has a firm foundation. There is solid metal below the cylinder, supporting it, but a cistern or base might be broken under a load if resting on its edges only.

In using, place either the head or the claw under the weight to be raised, and put the lever into the socket with the projecting lug on its lower edge downward so that it will come in contact with the stop. Work the lever until the weight has been raised to the required height or the jack has run out the full limit of its capacity. A jack cannot be run out beyond its capacity because a blow-hole is drilled through the wall of the cylinder at a level with the number of inches that the jack is intended to run out, and when this height is reached the fluid is pumped through the blow-hole. This provides an automatic blow-off safety valve to prevent running the ram entirely out of the cylinder, which might result in an accident.

If, for any reason, it is desired to continue the downward stroke of the lever without the pumping effect, raise the lever slightly and press it down slowly, so that the suction valve will not be seated, by which means the stroke will be missed. In pumping it is necessary to make a quick downward movement of the lever at the beginning of the stroke in order to close the upper valve by the quick surge of the fluid. To throw in both pumps, turn the valve handle to the left to the position marked "2 Pumps"; to throw out the upper pump, turn the valve handle to the position marked "1 Pump"; to lower the jack, turn the valve handle to the right toward the position marked "Lower," or withdraw the lever from the socket, turn it with the projection upward, replace it in the socket, and slowly push the lever down until the valves are unseated and the weight lowered to the position required. Care must be taken not to push the lever down too quickly, nor to check the lowering of a load suddenly, especially under a heavy load. The sudden checking of a heavy load, traveling at a high momentum, is likely to swell the cylinder to a permanent set, which will ruin it and require its replacement.

If a valve should stick on its seat, in which case the jack will not work, turn the valve handle slowly while pumping with the lever. This will clear the seat and remove the difficulty.

This type of jack is the only one in which the valves may be held from their seats and the pump operated, an arrangement which will be recognized by all users of hydraulic jacks as a great advantage.

DANGERS OF OVERLOADING JACKS

All of these jacks are designed to raise a load of their rated capacity with but one man at the lever, and not more than 150 pounds should be applied to the end of the lever. If one man of average weight cannot lift the load with the regular lever furnished with the jack, a jack of larger capacity should be obtained, for it is clear that the jack is then being overloaded. The increasing of the power of a hydraulic jack by lengthening the lever or the use of more than one man at the lever should be prohibited because of the tendency to overload the jack, with consequent injury.

THE CARE REQUIRED BY A JACK NOT IN CONSTANT USE

When standing unused, all jacks should be filled with suitable fluid to prevent rust and the drying up of the packings, and they should have the ram pumped up and lowered at least once in every week to keep the packings in good order. If they are to be stored for any length of time it would be well to empty and dry them and coat the polished surfaces with white lead and tallow or a rust preventive of good quality. The packings may sometimes be saved by being tightly wound with twine to prevent their warping, but usually it is the easiest and cheapest in the end to put in new packings when the jacks are again needed.

GOOD CARE ESSENTIAL TO KEEPING A JACK IN WORKING CONDITION

Trouble with hydraulic jacks is most frequently caused by neglect, for rust or foreign substances within a jack, or broken and dried-up packings render the jack useless. Good care is, therefore, essential in keeping a jack in order, and without this it is useless to expect a jack to give satisfactory service. Rust and sand or grit will soon injure the valves, packings and polished surfaces of the cylinder and pump, as these are the vulnerable parts of all hydraulic appliances. Every precaution should be taken to prevent the ingress of anything of an abrasive nature. If the ram is run out and becomes covered with dirt or grit it should be wiped perfectly clean before being returned to the cylinder. As already stated, the fluid with which the jack is charged should be kept free from all grit. A hydraulic jack will give continuous and efficient service if properly looked after, but if neglected for long periods it cannot be expected to maintain its efficiency.

MAINTAINING AND RENEWING PACKINGS

The packings are very simple, and the following directions will give all the information necessary to keep them in order:

If the fluid flows over the top of the cylinder or through the cylinder vent, the ram packing leaks. In this event remove the ram from the cylinder by pumping it up as far as possible and lifting it out of the cylinder. If the ram is too heavy or the packing is too tight to permit this, the ram may be entirely pumped out by driving a small wooden plug into the blow-hole in the cylinder to prevent the escape of the fluid, and pouring sufficient water into the reservoir to fill the cylinder entirely.

If it is found that the packing is only worn, place a strip of very thin tin under it. If it is broken or torn, remove the packing ring or plate and put on a new packing. If the packing is too large to enter the cylinder, or if the ram does not run down easily, take off a very little from the outside of the packing with a clean file or rasp. As a new packing must be reasonably tight, be careful not to take off too much, since it soon wears smooth. It should be fitted tightly enough to require the weight of two men to force down the ram when first put on, for, if the packing is made too slack, it will soon leak. As leather varies in thickness and uniformity, and as a soft or thin spot may develop in a packing otherwise good, it is not necessary to throw away this packing, but the packing should be built out uniformly by putting a small strip of thin tin, cut to the proper length, between the packing and the packing rings. If leather were always of the same thickness and quality this would not be necessary, but as leather varies in its porosity, thickness and texture, the use of a backing is necessary.

A bottom packing seldom gives trouble and should last for ears. If, however, it becomes necessary to renew it, this should be done by driving it from the upper end of the cylinder to the bottom by means of a wooden plug of approximately the diameter of the packing.

If the piston packings become worn, unscrew the plate over the pistons, turn the socket upward by means of the lever, lift the piston through the opening, renew the packings, and replace the piston and the plate.

PACKINGS OF THE UNIVERSAL HYDRAULIC JACK

Cup packings are used for the pistons and rams and for making the pressure-tight joint at the end of the cylinder. This is self-acting packing—that is, the packing is maintained in water-tight contact with the sliding surface of the cylinder by the simple action of the hydraulic pressure itself. The packing wears against the cylinder, as in most hydraulic jacks (which feature was the invention of Richard Dudgeon, and first adopted by him), and not against the ram, which is more liable to become injured or galled when run out of the cylinder.

It is useless to use cheap leather for hydraulic jack packings. Sound oak-tanned leather must be selected, and cut from the best part of the butt, and this leather must pass through a special treatment in order to make it available for hydraulic purposes. There is a difference of practice among manufacturers of hydraulic packings, some preferring to use the grain and some the skin side of the leather for the wearing surface.

The first cost of leather hydraulic packings is comparatively high, and if the surfaces against which they work are not carefully looked after and maintained in a proper condition, the packings will deteriorate rapidly and become a considerable portion of the expense of maintenance of a hydraulic jack.

MAINTAINING AND RENEWING VALVES

The maintenance and replacement of the valves in a Universal jack is the simplest possible operation. All of the valves are reached by the removal of one bonnet, and all that is required to replace them is to drop them into position and to replace the bonnet.

If the valves or valve seats become worn or scratched grind them to their seats with oil and a very little flour of emery. Be careful not to grind the valves too much, and to wash the valves and seats perfectly free from emery before replacing the valves. If the valves are deeply scored or have become too much worn they should be replaced by new ones. New valves should be lightly ground to the seat as described. This can best be done with a screw-driver with a slender bit of sufficient length to reach through the valve chamber to the

upper valve. If the seats are deeply cut they should be reset, and if very deeply cut should be both reamed and reset. If the packings are in good order and the ram does not rise in pumping, the upper or suction valves are not working properly. If the lever rises when the hand is removed, the lower or pressure valve is not working properly.

TO REACH THE VALVES

All of the valves are reached by the removal of one bonnet. If the pump is located in the ram, remove the ram from the cylinder; if the pump is located in the cistern, turn the cistern so as to expose the pump, when the bonnet may be removed.

TAKING THE UNIVERSAL JACK APART

All the joints in this jack are screw joints and the jack may be entirely taken apart and reassembled by means of a vise and wrenches. The vise shown on page 139, is a most efficient and satisfactory aid in repairing hydraulic jacks of any make and type. A ram or cylinder may not only be held without danger of slipping, and without injury, but the vise rotates so that the work can be locked in the position most convenient to the operator.

SUPPLYING PARTS FOR REPAIRS

All small parts of the universal jack are carried in stock and can be furnished on short notice. They are made in automatic machines and are interchangeable.

If jacks are in very bad condition or if the cylinders require refinishing, it may be cheaper to send them to the factory for repairs; for with the experience of many years in the design, manufacture and repair of high pressure hydrostatic machinery this factory is in a better position to make repairs than any other.

FORWARDING JACKS FOR REPAIRS

Jacks requiring repairs should be sent to Richard Dudgeon, 24 Columbia Street, New York. They should be tagged with the name and address of the shipper, for indentification, and should be accompanied by a letter giving the necessary instructions. The work of repairs is not commenced until written orders have been received. Jacks may safely be sent by freight without boxing as they are capable of withstanding hard usage without injury. The levers need not be sent unless they, too, require repairs.

UNIVERSAL PLAIN TYPE CAR INSPECTOR'S DOUBLE PUMP JACK

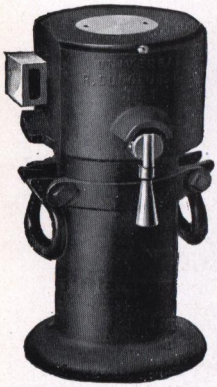


Fig. 536
See Fig. 537 for sectional view

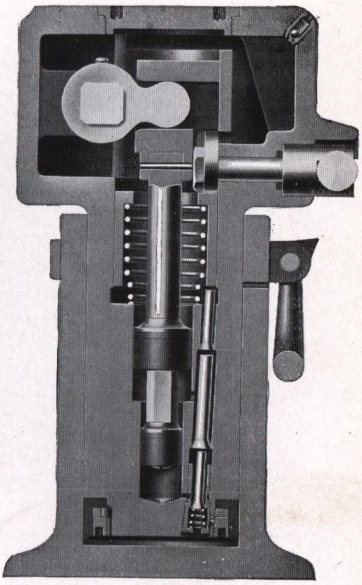


Fig. 537
Sectional view of Car Inspector's Jack

This is the latest improved type of car inspector's jack, and the only one of this form made with a double pump. This jack contains the fewest possible number of pieces, and is the simplest and most efficient jack on the market. This jack lowers by either the valve handle shown in cut, or by the lever. In raising a steel car the valve handle is turned downward, throwing out the other pump and giving a lift of the full capacity of the jack. When an empty car or a light wooden car is lifted the valve handle is turned horizontally to the left, which permits the use of both pumps, lifting the load at twice the ordinary speed. This is a great saving of time.

No.	Lift Tons	Run Out Inches	Height Inches	Size of Round Base Inches	Weight Pounds	Price	Code
462	15	5	11	6	48	$80	Ladkin
463	20	5	11	7	58	100	Lakelet
464	25	4	11	7½	76	115	Lariat
465	30	4	11	8	89	130	Lark

For additional information, see Circular No. 37.
For cistern type of car inspector's jack, see Fig. 560.

Discounts.....

UNIVERSAL DOUBLE PUMP PLAIN JACK

Fig. 538

Plain jack for use in presses or where there is a firm foundation or support.

No.	Lift Tons	Run Out Inches	Height Inches	Diameter of Base Inches	Weight Pounds	Price	Code
580	10	12	25	6	80	$80	True
581	10	18	32	6	98	95	Trump
582	10	24	39	6	110	110	Trunk
583	15	12	26	6½	102	100	Trust
584	15	18	32	6½	120	125	Truth
585	15	24	39	6½	140	150	Tunic
586	20	12	26	7	127	120	Tunnel
587	20	18	33	7	155	145	Turret
588	20	24	39	7	180	170	Tutor
589	30	9	22	8	146	150	Ukase
590	30	12	26	8	194	175	Ultra
591	30	18	33	8	260	210	Umbel
592	40	12	27	9	280	210	Umber
593	40	18	34	9	320	240	Unapt
594	50	12	28	10	333	240	Under
595	50	18	33	10	374	290	Uncommon
596	60	12	28	11	350	290	Unconcern

NOTE—Bottoms are made square up to 30 tons; 30 tons and larger sizes have round bottoms.

For additional information, see Circular No. 2.

Discounts----------

UNIVERSAL
DOUBLE PUMP RAILROAD JACK

Fig. 539

Railroad jack for work where stability and portability are required.

No.	Lift Tons	Run Out Inches	Height Inches	Diameter of Base Inches	Weight Pounds	Price	Code
597	10	12	25	11	105	$90	Undaunted
598	10	18	31½	11	146	100	Undergo
599	10	24	39	11	145	115	Underline
600	15	12	25	11	135	115	Underscore
601	15	18	31	11	155	140	Undulant
602	15	24	39	11	176	165	Unfailing
603	20	12	26	12	167	140	Unfear
604	20	18	33	12	203	165	Unhand
605	20	24	39	12	205	185	Unhinge
606	30	9	21	12	190	160	Unify
607	30	12	26	12	206	185	Union
608	30	18	32	13	255	220	Unite
609	40	12	27	13	265	220	Unman
610	40	18	32	13	310	260	Untie
611	50	12	28	15	374	250	Upper
612	50	18	33	15	350	300	Urban
613	60	12	27	16	320	300	Usher

For additional information, see Circular No. 3.

Discounts.....

UNIVERSAL
DOUBLE PUMP BASE JACK

Fig. 540

Base jack for railroad work or where a broad base insuring stability is required.

No.	Lift Tons	Run Out Inches	Height Inches	Diameter of Base Inches	Weight Pounds	Price	Code
614	10	12	25	11	109	$95	Unity
615	10	18	31	11	125	110	Uniform
616	15	12	25	12	135	125	Unhoped
617	15	18	32	12	158	150	Unmoved
618	20	12	26	13½	168	150	Uranus
619	20	18	32	13½	227	175	Unmindful
620	30	9	22	14	210	170	Unfurl
621	30	12	27	14	271	200	Unique
622	30	18	33	14	310	235	Unison
623	40	12	27	14½	340	240	Unlike
624	40	18	35	14½	392	280	Unyoke
625	50	12	28	15½	427	260	Upland
626	50	18	36	15½	491	310	Uproar
627	60	12	30	16	508	310	Upshot

For additional information, see Circular No. 4.

Discounts.....

UNIVERSAL
DOUBLE PUMP CLAW JACK

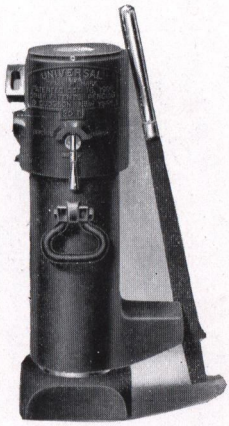


Fig. 541

For general use and for work that will not permit the head to be placed under the load.

No.	Lift Tons	Run Out Inches	Height Inches	Weight Pounds	Price	Code
629A	10	12	25	125	$100	Upstay
629B	10	18	32	144	120	Urnflower
629C	15	12	26	162	150	Urubu
629D	15	18	32	190	185	Usnea
629E	20	12	26	203	200	Usitate
629F	20	18	33	245	240	Uvarovite
630	30	9	22	290	225	Umpire
631	30	12	26	310	250	Unbend
632	30	18	32	364	285	Uncover
633	40	12	27	355	300	Uneven
634	40	18	34	460	325	Unfold
635	50	12	27	450	325	Unlock

For additional information, see Circular No. 5.

Discounts.....

UNIVERSAL DOUBLE PUMP SPECIAL CLAW JACK

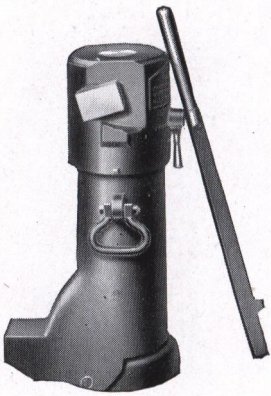


Fig. 542

Claw Jack with overhanging claw to lift from close to the ground.

No.	Lift Tons	Run Out Inches	Height Inches	Weight Pounds	Price	Code
638A	10	12	25	128	$100	Habitant
638B	10	18	32	147	120	Halberd
638C	15	12	26	166	150	Halma
638D	15	18	32	195	185	Hammock
638E	20	12	26	208	200	Hardy
638F	20	18	33	250	240	Harmonic
668G	30	9	22	297	225	Hero
638H	30	12	26	317	250	Hillside
638I	30	18	32	372	285	Hillock
638J	40	12	27	364	300	Hyacinth
638K	40	18	34	468	325	Idyl
638L	50	12	27	460	325	Imperious

For additional information, see Circular No. 15.

Discounts.....

UNIVERSAL DOUBLE PUMP RAILROAD JACK WITH INDEPENDENT CLAW

Fig. 543

Independent claw jack for work where stability and a low lift are required.

No.	Lift Tons	Run out Inches	Height Inches	Diameter of Base Inches	Weight of Jack with Claw Pounds	Weight of Jack without Claw Pounds	Price	Code
639A	10	12	26	11	155	105	$95	Utility
639B	10	18	32	11	195	125	110	Ute
639C	15	12	26	11	195	135	135	Ursula
639D	15	18	32	11	210	155	160	Urania
639E	20	12	27	12	252	170	175	Uralina
639F	20	18	33	12	295	190	200	Urva
640	30	9	22	12	270	190	190	Unravel
641	30	12	27	12	330	213	220	Unrest
642	30	18	33	13	385	260	260	Unroll
643	40	12	27	13	380	270	260	Unseat
644	40	18	33	13	465	315	300	Unship
645	50	12	28	15	530	379	300	Unstrung
646	50	18	33	15	580	480	350	Unsung
647	60	12	28	16	625	460	350	Unvaried

For additional information, see Circular No. 6.

Discounts.....

UNIVERSAL DOUBLE PUMP PLAIN JACK WITH REMOVABLE CLAW

Fig. 544

Independent claw jack where a low lift close to the ground is required.

No.	Lift Tons	Run Out Inches	Height Inches	Diameter of Base Inches	Weight of Jack with Claw Pounds	Weight of Jack without Claw Pounds	Price	Code
649A	10	12	26	6	134	82	$95	Industrial
649B	10	18	32	6	175	100	110	Islet
649C	15	12	26	6½	166	104	135	Ivy
649D	15	18	32	6½	192	122	160	Jubilant
649E	20	12	27	7	209	129	175	Judicious
649F	20	18	33	7	262	157	200	Jupiter
649G	30	9	22	8	228	148	190	Keynote
649H	30	12	27	8	316	196	220	Khedive
649I	30	18	33	8	402	262	260	Kingly
649J	40	12	27	9	392	282	260	Kremlin
649K	40	18	33	9	472	322	300	Kraal
649L	50	12	28	10	485	335	300	Labret
649M	50	18	33	10	526	376	350	Laburnum
649N	60	12	28	11	517	352	350	Lacmoid

For additional information, see Circular No. 14.

Discounts.....

UNIVERSAL DOUBLE PUMP PRESS JACK WITH THRUST COLLAR AND RACK AND PINION MOVEMENT TO THE RAM

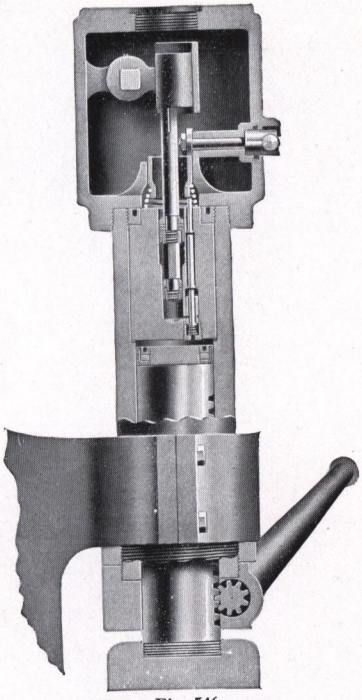


Fig. 546

Press jack with thrust collar to be used in a frame.

No.	Lift Tons	Run Out Inches	Height Inches	Diameter of Cylinder above Thrust Collar Inches	Weight Pounds	Price	Code
650	30	9	29	5½	176	$176	Unarmed
651	30	12	32	5½	224	200	Unaware
652	40	9	29½	6	240	235	Unburden
653	40	12	32½	6	310	240	Uncalled
654	50	9	30	6¾	300	280	Undoubted
655	50	12	33	6¾	363	290	Undulate
656	60	9	30½	7½	325	300	Unhorse
657	60	12	33½	7½	380	350	Unicorn

For additional information, see Circular No. 9.

Discounts.....

UNIVERSAL DOUBLE PUMP PRESS JACK WITH FLANGED HEAD AND RACK AND PINION MOVEMENT TO THE RAM

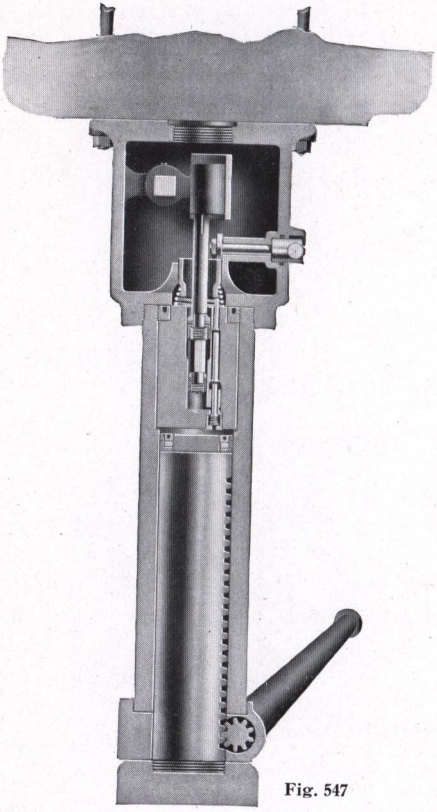


Fig. 547

Press jack with flanged head to permit its being bolted to an overhead beam or girder.

No.	Lift Tons	Run Out Inches	Height Inches	Diameter of Flange on Head Inches	Weight Pounds	Price	Code
660	30	9	29	11	171	$175	Unwavering
661	30	12	32	11	219	200	Useful
662	40	9	29½	11	235	235	Uproot
663	40	12	32½	11	305	240	Unalloyed
664	50	9	30	12	295	280	Upside
665	50	12	33	12	358	290	Upstart
666	60	9	30½	12	320	300	Upward
667	60	12	33½	12	375	350	Urbane

For additional information, see Circular No. 10. Discounts.....

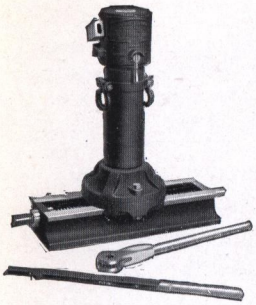


Fig. 548

Traversing jack with railroad type of base

UNIVERSAL DOUBLE PUMP RAILROAD TRAVERSING JACK

No.	Lift, Tons	Run Out, Inches	Height of Jack Inches	Height of Jack and Bed, Inches	Weight, Pounds	Price	Code
668	10	12	25	30	250	$145	Utilize
669	15	12	25	30	275	175	Utensil
670	20	12	26	31	330	215	Utgard
671	30	12	26	31	425	270	Usage
672	40	12	26	31	450	310	Urbanity

For additional information, see Circular No. 25.

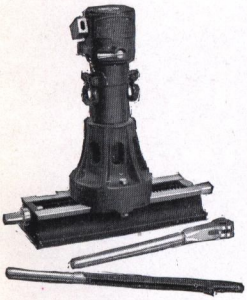


Fig. 549

Traversing jack with regular type of base

UNIVERSAL DOUBLE PUMP BASE TRAVERSING JACK

No.	Lift, Tons	Run Out, Inches	Height of Jack Inches	Height of Jack and Bed, Inches	Weight, Pounds	Price	Code
673	10	12	25	30	240	$150	Upsilon
674	15	12	25	30	265	185	Uprising
675	20	12	26	31	300	225	Unbolt
676	30	12	26	31	415	285	Untwine
677	40	12	26	31	440	330	Untwist

For additional information, see Circular No. 26.

Discounts.....

THE NEW TYPE OF HORIZONTAL JACK

The Universal horizontal jack contains all the advantages of the vertical type, and has in addition to these advantages improvements which do not exist in any other type of horizontal jack and which put this type of jack in a class by itself.

THE UNIVERSAL HORIZONTAL DOUBLE PUMP JACK

This jack has the following advantages which distinguish it from all other types of horizontal jacks:

It is the only double pump horizontal jack with but a single pressure valve.

It is the only double pump horizontal jack with but three valves in all.

It is the only horizontal jack with but one pressure valve, which lowers by means of an independent lowering device.

It is the only horizontal jack lowering by means of both the lever and the valve handle.

It is the only horizontal jack in which the position of the valves is indicated by means of the lowering device.

It is the only horizontal jack with superimposed valves and pistons.

It is the only horizontal jack provided with valves that will perform each other's work in case of necessity.

It is the only horizontal jack provided with pistons that will perform each other's work in case of necessity.

It is the only horizontal jack in which the pump may be used while the valves are open.

It is the only horizontal jack giving access to the valves by removing one bonnet.

It is the only horizontal jack in which the pump can be removed without disturbing the remainder of the jack.

THE DOUBLE PUMP

The use of a double pump in a horizontal jack is not new, but the use of the simplified form of the Universal double pump is new to this type of jack. The double pump will run the ram out to the load or lift a half load with double the speed of the single pump. When one pump only is required, a quarter turn of the valve handle will throw out the auxiliary pump and give the action of a single pump jack.

SPECIAL ADVANTAGES OF THIS FORM OF DOUBLE PUMP

The old double pump jacks have the disadvantage of a complication of valves and passages, the simplest having three pressure valves, each in its own passage, the disturbance of any one of which would render the jack inoperative. The new form of double pump has but one passage, instead of three (giving but one pressure valve), and it also combines all the valves in one chamber, so that if the pressure valve should become inoperative, either of the other valves can take its place in checking the back flow and will also perform the usual functions of pumping if pumping is continued. As this new type lowers by means of the pressure valve it does not require a separate and independent lowering valve as do all other forms of double pump jacks, as well as all other jacks which lower by means of an independent lowering device.

This form, therefore, greatly reduces the chance of the valves getting out of order, and rendering the jack inoperative, as all three valves in one passage in the new form must be out of order at one time to make it inoperative, instead of one valve in any one of three passages as in the old form.

This advantage also applies to the pistons, as they also are arranged tandem instead of side by side, so that either piston or any valve may become out of order and the jack continue to work up to the limit of its capacity.

THE LOWERING OF THE UNIVERSAL HORIZONTAL JACK

This jack can be lowered by either the lever or the valve handle. In either case the lowering is effected by pushing all the valves from their seats, which allows the fluid to short circuit around the valves from the cylinder to the reservoir.

DESCRIPTION AND OPERATION OF THE UNIVERSAL HORIZONTAL JACK

The two sectional views, Figs. 550 and 551, show the construction of this type of jack. Fig. 550 shows the section through the cylinder and pump chambers, and Fig. 551 shows the section through the piston and valve chambers. Fig. 552 shows the larger parts of this jack, and Fig. 553 shows in one group all the other component parts of the jack. By means of these cuts the following details will be easily understood.

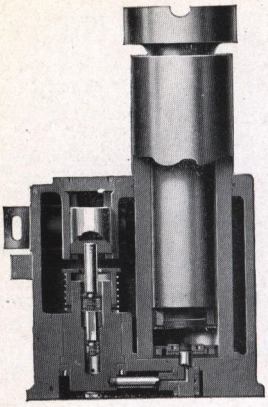


Fig. 550

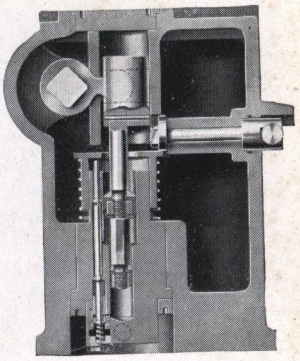


Fig. 551

The piston is mounted in a head which moves between guides. The valves are located in an imposed position in the wall of the pump. The valves are controlled by means of a hollow cylinder with an inturned flange which surrounds the top of the pump, and which is held up, by means of a heavy spiral spring, from coming in contact with the projecting end of the uppermost valve. The valve handle is fastened to a shaft which projects through the wall of the cistern. On the inner end of this shaft a cam is attached which impinges on the flange of this push-collar. By rotating the valve handle the cam is

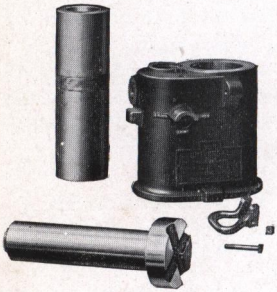


Fig. 552

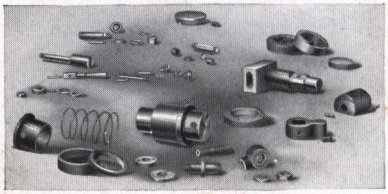


Fig. 553

brought to bear upon the push collar, so that one valve, two valves, or three valves, may be pressed successively from their seats, thus opening a passage from the ram chamber into the reservoir. If it is desired to lower the ram by means of the lever, the lever is withdrawn from the socket and reversed so that the lug is at the top, is replaced in the socket and pushed below its normal length of stroke. This brings the piston head into contact with the flange of the push-collar, and depresses the valves from their seats after the same manner as when the cam is used. The two pistons are on one piston-rod, and are of such size that the upper piston has the same effective area as the lower piston. Both pistons may be used together, in which case a single stroke will discharge twice as much liquid into the ram chamber as when the lower piston is used alone. When both pistons are required, the valve handle is turned to the left, which rotates the cam so that its shortest diameter permits the push-collar to rise and allow the seating of the upper valve. When the piston is raised by means of the lever, a vacuum is created in the piston chamber and the liquid in the reservoir flows past the upper valve through the connecting port into the upper piston chamber, and past the middle valve through the connecting port into the lower piston chamber. The downward stroke closes the upper valve, and the liquid then forces the bottom valve from its seat and flows along the connecting pipe to the ram chamber. The middle valve performs no work, since, being heavier than the fluid it displaces, it drops by gravity and remains open.

When it is desired to use the lower pump alone, the valve handle is turned straight downward, which brings the cam into contact with the push-collar, unseating the top valve, and holding it from its seat. The downward stroke of the lever seats the middle valve, and forces the contents of the lower pump chamber past the lower valve, while the contents of the upper pump chamber, following the line of least resistance, flows idly back into the reservoir past the open valve.

THE VALVE HANDLE

The valve handle is attached to the cam shaft with a steel pin, and is so designed and protected that liability of injury is removed. This valve handle turns freely but is adjusted by the nut on the shaft so that it will always remain where placed. The cam is elliptical in shape and so designed that

the pressure valve may be forced from its seat with the pull of one finger on the valve handle. The lowering of this form of jack is more easily controlled than the lowering of the old type. It can be instantly checked and the speed regulated to the smallest degree necessary.

ADVANTAGES OF THE VALVE HANDLE

The valve handle always shows the position of the valves; if the handle is turned to the left, both pumps are in use; if it is straight downward, one pump is in use; and if turned to the right, the valves are opened and the fluid returned from the ram chamber to the reservoir. The valve handle is located in the most advantageous position possible, is fully protected against injury, and forms a part of the lowering mechanism, so that there is no key or wrench to become lost or mislaid. In case the valves stick on their seats they may be pressed off by either the valve handle or the lever, as all the valves are opened by means of the lowering device. The troublesome sticking of the piston valves is therefore entirely eliminated. If the valves are prevented from seating by any obstruction they may be opened by means of the valve handle, and the seat or passage cleared by working the pump.

DETAILED DESCRIPTION OF THE PARTS OF THE UNIVERSAL HORIZONTAL JACK

As there are some parts in the horizontal type of jack which are different from the corresponding parts in the vertical type they will be described in detail.

THE PUSH-COLLAR AND SPRING

Fig. 554 shows the push-collar and spring. The collar is cut from bar steel. It fits loosely around the top of the pump bearing upon the projecting valve stem and transfers the motion of the cam or lever without their special adjustment to bring them in contact with the valve.

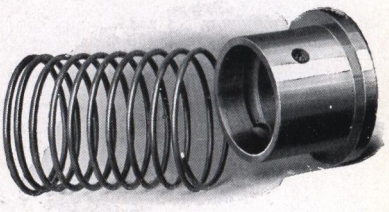


Fig. 554

THE PUMP OF THE UNIVERSAL HORIZONTAL JACK

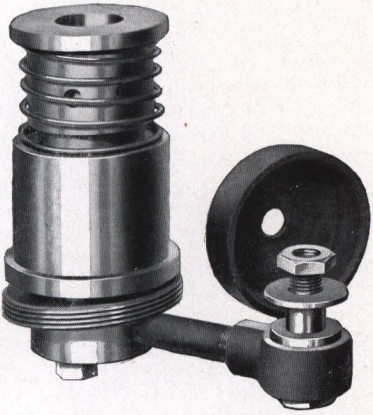


Fig. 555

Fig. 555 shows an exterior view of the pump of the horizontal jack with the parts assembled. Fig. 556 shows a perspective view of the parts of the horizontal pump taken apart and ready for assembling.

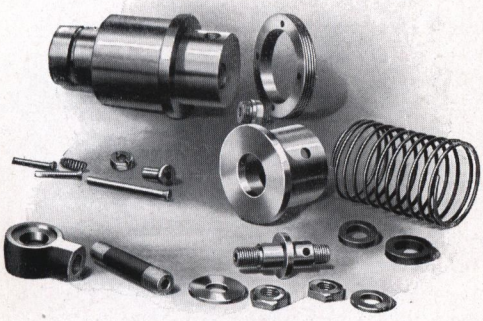


Fig. 556

The pump is made in several pieces in order to simplify its insertion and removal.

The method of securing the pump in the cistern can be seen in Fig. 558. After the cylinder has been screwed into

the cistern the bottom joint of the cylinder is sealed by driving a leather cup, which is held in place by a ring, to the bottom of the cylinder. An opening through the cup corresponds to the opening for the pump connection which is drilled through the bottom of the cistern. The tool steel connecting stud, shown by Fig. 557, is inserted in this opening and held in position by means of a steel washer and nut, which clamps the bottom packing in place and prevents leakage of the liquid around the connection. This is an advantage over the old method of inserting the pump, by which the end of the pump projected slightly above the bottom of the cistern, against which the packing pressed, and which discharged its fluid through a small opening cut through the packing in line with the duct in the pump.

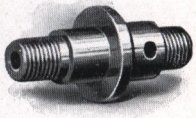


Fig. 557

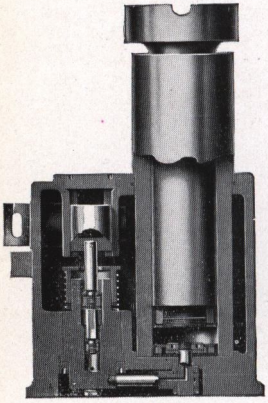


Fig. 558

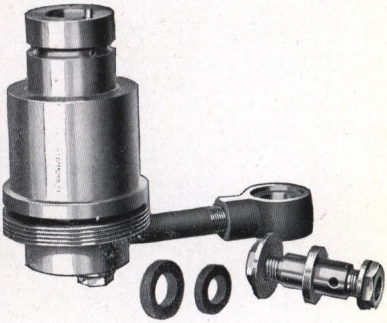


Fig. 559

Fig. 559 shows the pump ready for insertion in the cistern, and before being clamped to the cylinder connection. A short length of hydraulic pipe is screwed into the pump, and on the end of this pipe is screwed a steel eye-shaped forging, which surrounds the lower portion of the connecting stud when the pump is in place, the pump being dropped into position with the stud passing through the eye. The pump is then held in place by the threaded retaining ring; and the eye on the end of the pipe and forming the connection with

the cylinder is held tightly in place by a washer and nut. The pump is removed by unscrewing the nut and ring. While the old type of pump was made in one piece, this type is much more easily attached and detached and is not subject to the breakage of the older form. It is also much more easily kept tight and in repair.

THE CAM, CAM SHAFT, VALVE HANDLE, PISTON HEAD, AIR VALVE AND PISTONS, FOR THE HORIZONTAL JACK

These parts are the same as used in the vertical type of jack, and detailed description may be found on pages 25 and 26 of this catalogue.

COMPARISON OF PARTS OF DOUBLE PUMP HORIZONTAL JACKS

Fig. 535 shows the parts of the Universal horizontal jack compared with the corresponding parts in the old style of double pump horizontal jacks. The small group at the lower left corner of the illustration shows the parts in the new type, and the large group the parts in the old, both to the same scale.

ACCESSIBILITY OF THE INTERIOR PARTS OF THE HORIZONTAL JACK

The accessibility of the interior parts of the horizontal type of jack is one of its distinctive features. All the valves may be removed by turning the jack over and unscrewing a bonnet; and the pistons may be removed for renewal of packings by unscrewing the plate in the top of the cistern and lifting them through the opening.

DIRECTIONS FOR USE

Those accustomed to the use of hydraulic jacks will find these directions all that are necessary. When both pumps are used, turn the valve handle to the left; when one pump only is required, turn it straight downward. To lower the jack, turn the valve handle to the right, or use the lever in the ordinary manner.

GENERAL DIRECTIONS FOR USE AND MAINTENANCE

General directions for testing, filling, cleaning, use, care, and repair will be found in connection with the vertical type on pages 27 to 34, and as they apply equally to the horizontal type they will not be repeated here.

UNIVERSAL CAR INSPECTOR'S DOUBLE PUMP JACK

Fig. 560

This jack lowers by either the valve handle shown in cut or by the lever. When both pumps are used, the ram of the 7-ton size can be run out its full distance in a dozen strokes, lifting 4 tons.

For additional information, see Circular No. 29.

No.	Lift Tons	Run Out Inches	Height Inches	Size of Elliptical Base Inches	Weight Pounds	Price	Code
680	7	5	11	9 x 6	56	$75	Vacant
681	10	5	11	9¾ x 6¾	70	90	Vacate
682	15	5	11	9¾ x 6¾	90	120	Vacancy
683	20	5	11	10¼ x 8	105	135	Vacuum
684	25	5	11	11¼ x 8¼	115	145	Vagary
685	30	5	11	11¾ x 9	125	155	Vagrant

UNIVERSAL CAR INSPECTOR'S DOUBLE PUMP JACK WITH LEVER AT SIDE

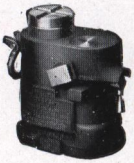


Fig. 561

This type of car inspector's jack differs from the type shown by Fig. 560 in that the lever is operated at the side and not at the end. This permits the use of the jack where space is limited, especially where there is a raised station platform.

No.	Lift Tons	Run Out Inches	Height Inches	Size of Elliptical Base Inches	Weight Pounds	Price	Code
686	7	5	11	9 x 6	56	$75	Vane
687	10	5	11	9¾ x 6¾	70	90	Vase
688	15	5	11	9¾ x 6¾	90	120	Vair
689	20	5	11	10¼ x 8	105	135	Valonia
689A	25	5	11	11¼ x 8¼	115	145	Leader
689B	30	5	11	11¾ x 9	125	155	Lodestone

This jack lowers by either the valve handle shown in cut or by the lever. For additional information, see Circular No. 36.

Discounts .....

UNIVERSAL HORIZONTAL DOUBLE PUMP JACK WITH REMOVABLE CLAW

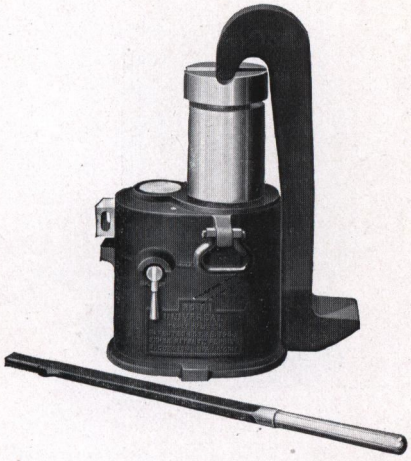


Fig. 562

This is the latest improved type of horizontal claw jack and is intended for lifting both on the ram head in the usual manner, and by means of the claw where a low lift close to the ground is necessary. This form of jack is made only in the smaller sizes, as the larger capacity jacks require a special type of cistern to prevent its being crushed by a heavy load on the claw.

No.	Lift Tons	Run Out Inches	Height Inches	Size of Elliptical Base Inches	Weight of Jack without Claw Pounds	Weight of Jack with Claw Pounds	Price	Code
726	30	12	22	14¼ x 11	258	325	$240	Abound
727	30	18	28	14¼ x 11	318	401	285	Abroad
728	40	12	22	15¾ x 11	320	406	290	Absolute
729	40	18	28	15¾ x 11	355	465	340	Abyss

For additional information, see Circular No. 32.

Discounts.....

UNIVERSAL HORIZONTAL DOUBLE PUMP JACK WITH REINFORCED CISTERN AND REMOVABLE CLAW

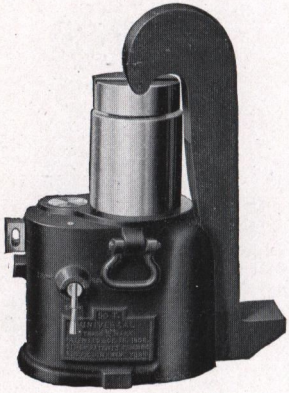


Fig. 563

This is the latest improved type of horizontal claw jack and is intended for lifting both on the ram head in the usual manner and also by means of the claw where a low lift close to the ground is necessary. It is provided with a specially designed cistern which not only gives a support and guide to the claw but also prevents the crushing of the cistern either by the load on the claw or by the strain coming on the front of the cistern by reason of the load. The larger claw jacks only are made in this form, as this feature is not required for the smaller sizes.

No.	Lift Tons	Run Out Inches	Height Inches	Size of Elliptical Base Inches	Weight of Jack without Claw Pounds	Weight of Jack with Claw Pounds	Price	Code
730	30	12	21	15 x 11	290	351	$240	Accent
731	30	18	28	15 x 11	350	433	285	Acclaim
732	40	12	22	15¾ x 11	332	418	290	Accord
733	40	18	28	15¾ x 11	370	480	340	Account
734	50	12	23	16 x 11½	414	534	320	Acme
735	50	18	28	16 x 11½	475	565	380	Adorn
736	60	9	19	18 x 12½	485	607	310	Admire
737	60	12	23	18 x 12½	590	718	340	Adroit
738	60	18	30	18 x 12½	650	771	420	Advance
739	80	9	21	19¾ x 14½	565	684	360	Advice
740	80	12	24	19¾ x 14½	665	795	390	Aim
741	80	18	31	19¾ x 14½	740	891	455	Alcove
742	100	9	22	22 x 16	735	946	400	Alert
743	100	12	25	22 x 16	820	1042	475	Alpha
744	100	18	32	22 x 16	1025	1268	550	Amaze

For additional information, see Circular No. 33.

Discounts.....

UNIVERSAL HORIZONTAL DOUBLE PUMP JACK WITH PLAIN HEADED RAM

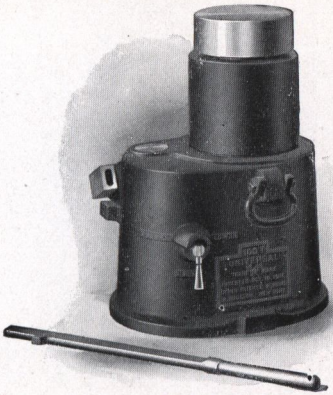


Fig. 564

This type of jack differs from those shown by Fig. 565 and Fig. 566 in that it has a smooth head on the ram. This especially adapts it for use with pipe grips in pulling well pipe and in similar work.

No.	Lift Tons	Run Out Inches	Height Inches	Size Elliptical Base Inches	Weight Pounds	Price	Code
760	30	12	21¼	13 x 10	260	$200	Balm
761	30	18	27	13 x 10	316	235	Banner
762	40	12	22	14 x 11	316	240	Basis
763	40	18	28	14 x 11	357	280	Beacon
764	50	12	22	15 x 11½	347	260	Beauty
765	50	18	29	16½ x 12¾	514	310	Benefit
766	60	9	19	16½ x 12½	452	250	Belief
767	60	12	22	16½ x 12½	552	275	Bestow
768	60	18	28	16½ x 12½	602	350	Betoken
769	80	9	20	17¾ x 14¼	553	310	Billow
770	80	12	25	17¾ x 14¼	658	335	Blithe
771	80	18	30	17¾ x 14¼	728	385	Blue
772	100	9	21	20¼ x 16½	724	375	Bonny
773	100	12	24	20¼ x 16½	880	400	Border
774	100	18	32	20¼ x 16½	1069	475	Boulder
775	125	9	22	21 x 17	855	425	Bounteous
776	125	12	25	21 x 17	905	450	Brace
777	125	18	32	21 x 17	1155	525	Brave
778	150	12	26	23 x 18	1170	500	Bright
779	150	18	33	23 x 18	1330	575	Brisk
779A	200	12	27	24 x 20	1200	600	Briquet
779B	200	18	34	24 x 20	1500	700	Brioche
779C	250	12	28	27 x 24	1700	725	Briolette
779D	250	18	35	27 x 24	2000	850	Brisinga

For additional information, see Circular No. 45.

For special information relating to Universal Horizontal Jack, see Circular No. 34.

For special information relating to Universal Jack, see Circular No. 1.

Discounts.....

UNIVERSAL HORIZONTAL DOUBLE PUMP JACK WITH GROOVE HEADED RAM

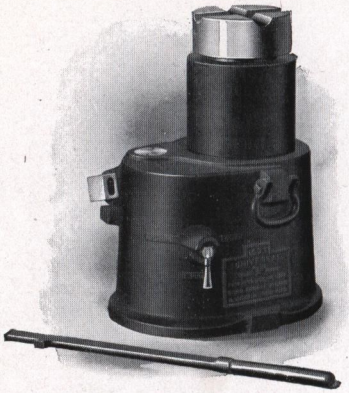


Fig. 565

This type of jack differs from those shown by Fig. 564 and Fig. 566 in that it has a grooved head on the ram. This jack is especially intended for use against timbers in lifting bridges and work of a similar nature, because the cut in the head prevents lateral slipping, which might produce an accident.

No.	Lift Tons	Run Out Inches	Height Inches	Size of Elliptical Base Inches	Weight Pounds	Price	Code
780	30	12	21¼	13 x 10	258	$200	Bugle
781	30	18	27	13 x 10	314	235	Buoyant
782	40	12	22	14 x 11	314	240	Cabinet
783	40	18	28	14 x 11	355	280	Cable
784	50	12	22	15 x 11½	345	260	Calcium
785	50	18	29	16½ x 12¾	512	310	Calm
786	60	9	19	16½ x 12½	450	250	Cameo
787	60	12	22	16½ x 12½	550	275	Candid
788	60	18	28	16½ x 12½	600	350	Candor
789	80	9	20	17¾ x 14¼	550	310	Canopy
790	80	12	25	17¾ x 14¼	655	335	Capable
791	80	18	30	17¾ x 14¼	725	385	Capital
792	100	9	21	20¼ x 16½	720	375	Captain
793	100	12	24	20¼ x 16½	876	400	Caprice
794	100	18	32	20¼ x 16½	1065	475	Captivate
795	125	9	22	21 x 17	850	425	Cardinal
796	125	12	25	21 x 17	900	450	Career
797	125	18	32	21 x 17	1150	525	Carnival
798	150	12	26	23 x 18	1165	500	Cordate
799	150	18	33	23 x 18	1325	575	Cascade
800	200	12	27	24 x 20	1200	600	Casino
801	200	18	34	24 x 20	1500	700	Castle
802	250	12	28	27 x 24	1700	725	Cathedral
803	250	18	35	27 x 24	2000	850	Cavalier

For additional information, see Circular No. 46.

For special information relating to Universal Horizontal Jack, see Circular No. 34.

For special information relating to Universal Jack see Circular No. 1.

Discounts.....

UNIVERSAL HORIZONTAL DOUBLE PUMP JACK WITH REMOVABLE CAP ON RAM

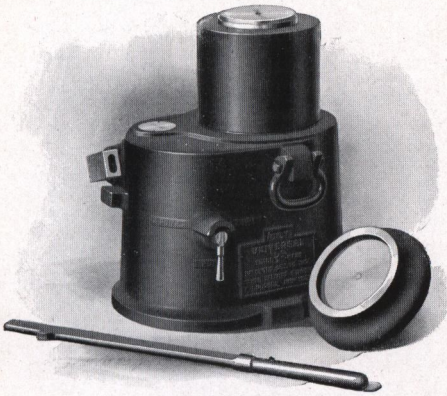


Fig. 566

This type of jack differs from those shown by Fig. 564 and Fig. 565 in that a removable cap is provided on the ram. This especially adapts it for use in restricted space, as the cap may then be removed and the jack used without the cap. Note column "Height Without Cap."

No.	Lift Tons	Run Out Inches	Height with Cap Inches	Height without Cap Inches	Size of Elliptical Base Inches	Weight Pounds without Cap	Price	Code
810	30	12	21¼	20	13 x 10	250	$200	Charm
811	30	18	27	25½	13 x 10	306	235	Charter
812	40	12	22	20½	14 x 11	304	240	Chevalier
813	40	18	28	26½	14 x 11	345	280	Citadel
814	50	12	22	20½	15 x 11½	335	260	Clarion
815	50	18	29	26½	16½ x 12¾	500	310	Coast
816	60	9	19	17½	16½ x 12½	435	250	Colonel
817	60	12	22	20½	16½ x 12½	535	275	Commander
818	60	18	28	26½	16½ x 12½	585	350	Commodore
819	80	9	20	18	17¾ x 14¼	530	310	Compeer
820	80	12	25	21	17¾ x 14¼	635	345	Comrade
821	80	18	30	27	17¾ x 14¼	705	385	Conquest
822	100	9	21	19	20¼ x 16½	700	375	Corona
823	100	12	24	22	20¼ x 16½	856	400	Coronet
824	100	18	32	28	20¼ x 16½	1035	475	Cosmos
825	125	9	22	19	21 x 17	830	425	Council
826	125	12	25	22	21 x 17	880	450	Courage
827	125	18	32	28	21 x 17	1125	525	Crescent
828	150	12	26	22	23 x 18	1135	500	Crown
829	150	18	33	28	23 x 18	1295	575	Crystal
830	200	12	27	23	24 x 20	1175	600	Constant
831	200	18	34	29	24 x 20	1475	700	Criterion
832	250	12	28	24	27 x 24	1675	725	Crest
833	250	18	35	30	27 x 24	1975	850	Cynosure

For additional information, see Circular No. 47.

For special information relating to Universal Horizontal Jack, see Circular No. 34.

For special information relating to Universal Jack, see Circular No. 1.

Discounts.....

UNIVERSAL HORIZONTAL ROUND BASE DOUBLE PUMP JACK

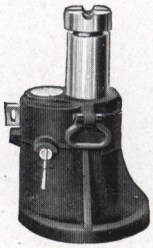


Fig. 567

This is the latest improved type of horizontal round base jack and is intended for use on earth or where the foundation or support is of such a nature that a larger area of base is demanded, or where unusual stability is required. Although this jack is capable of running out its full length horizontally, it is inconvenient for such use on account of its projecting round base. The smaller size jacks only are made in this form.

No.	Lift Tons	Run Out Inches	Height Inches	Diameter of Base Inches	Weight Pounds	Price	Code
840	7	12	20	11	102	$80	Defender
841	7	18	26	11	120	85	Defiant
842	10	12	20	12	135	95	Definite
843	10	18	26	12	166	110	Deft
844	10	24	32	12	196	130	Delegate
845	15	12	21	12	150	125	Delight
846	15	18	26	12	187	150	Demesne
847	15	24	32	12	200	175	Dexter
848	20	12	21	13½	197	150	Diadem
849	20	18	27	13½	242	175	Diamond

For additional information, see Circular No. 31.

For special information relating to Universal Horizontal Jack, see Circular No. 34.

For special information relating to Universal Jack, see Circular No. 1.

Discounts.....

UNIVERSAL OBLONG BASE HORIZONTAL DOUBLE PUMP JACK

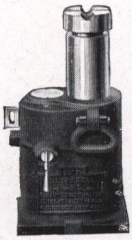


Fig. 568

This is the latest improved type of horizontal oblong base jack and is intended for use on earth or where the foundation or support is of such a nature that a larger area of base is demanded, or where unusual stability is required. The smaller size jacks only are made in this form.

No.	Lift Tons	Run Out Inches	Height Inches	Oblong Base Inches	Weight Pounds	Price	Code
850	7	12	20	9 x 5½	102	$80	Dictator
851	7	18	26	9 x 5½	120	85	Dignity
852	10	12	20	10 x 7	135	95	Diligent
853	10	18	26	10 x 7	166	110	Diploma
854	10	24	32	10 x 7	196	130	Diplomatic
855	15	12	21	11 x 8¾	170	125	Director
856	15	18	26	11 x 8¾	187	150	Discipline
857	15	24	32	11 x 8¾	200	175	Domestic
858	20	12	21	12 x 8¾	197	150	Dominion
859	20	18	27	12 x 8¾	242	175	Dome

For additional information, see Circular No. 30.

Discounts.....

UNIVERSAL HORIZONTAL DOUBLE PUMP JACK WITH OBLONG BASE AND REMOVABLE CLAW

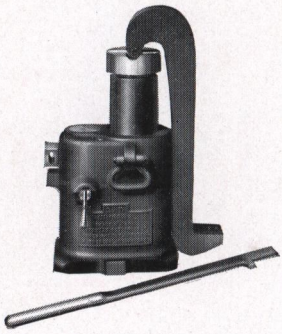


Fig. 569

This is the latest improved type of horizontal oblong base jack with independent claw. It is intended for use in lifting from the ground where the larger area of base is demanded or where unusual stability is required. The smaller size jacks only are made in this form as is shown by the price list. For larger capacities than 20 tons see Figs. 562 and 563.

No.	Lift Tons	Run Out Inches	Height Inches	Oblong Base Inches	Weight Pounds	Price	Code
860	7	12	20	9 x 5½	127	$85	Drama
861	7	18	26	9 x 5½	155	90	Dream
862	10	12	20	10 x 7	150	105	Droll
863	10	18	26	10 x 7	204	125	Dryad
864	10	24	32	10 x 7	250	150	Dulcimer
865	15	12	21	11 x 8¾	208	150	Duration
866	15	18	26	11 x 8¾	235	180	Dwarf
867	15	24	32	11 x 8¾	265	215	Dynasty
868	20	12	21	12 x 8¾	245	185	Durable
869	20	18	27	12 x 8¾	298	215	Druid

For additional information, see Circular No. 41.

Discounts.....

UNIVERSAL DOUBLE PUMP JACK WITH SHORT INDEPENDENT CYLINDER AND RAM

This type of jack is intended for use in boiler furnaces under ships, in subway construction, and in other confined places. The cylinder and ram are made as short as possible, and this type is therefore not recommended for lifting a live load because of the short length of ram remaining in the cylinder when it is fully run out. See list on page 66 for prices of jack intended to lift a live load. This is the most simple, efficient and reliable independent double pump ja k on the market. The pump and cylinder are connected by a flexible copper pipe, 12 feet long, which is included in the price of the jack.

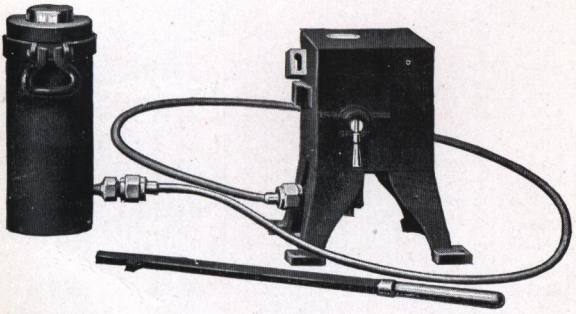


Fig. 570

Gauges showing pressure per square inch in pounds, and total pressure on the ram in tons, and provided with a safety check valve, will be furnished, attached, for $25.00, net, extra.

For additional information, see Circular No. 8.

No.	Lift Tons	Run Out In.	Diam. of Ram Inches	Diameter of Cylinder Inches	Height of Jack with Ram down Inches	Weight of Cylinder and Ram Pounds	Price	Code
870	40	4	4	6⅛	9½	74	$270	Earl
871	40	6	4	6⅛	12	96	275	Earnest
872	40	8	4	6⅛	14½	117	280	Eastern
873	40	12	4	6⅛	19¾	155	290	Eclat
874	50	4	4½	6⅞	9½	93	290	Eclipse
875	50	6	4½	6⅞	12	120	295	Edify
876	50	8	4½	6⅞	14½	146	300	Efficient
877	50	12	4½	6⅞	19¾	200	310	Eglantine
878	60	4	5	7⅝	9½	114	310	Eldorado
879	60	6	5	7⅝	12	148	315	Elect
880	60	8	5	7⅝	14½	181	320	Eloquent
881	60	12	5	7⅝	19¾	245	330	Emblem
882	70	4	5½	8⅜	9½	146	330	Eminent
883	70	6	5½	8⅜	12	190	335	Emperor
884	70	8	5½	8⅜	14½	232	340	Empire
885	70	12	5½	8⅜	19¾	314	350	Emporium
886	85	4	6	9⅛	9½	163	345	Energy
887	85	6	6	9⅛	12	212	350	Ensign
888	85	8	6	9⅛	14½	258	355	Enterprise
889	85	12	6	9⅛	19¾	351	365	Epoch
890	100	4	6½	9⅞	9½	192	365	Equity
891	100	6	6½	9⅞	12	248	370	Era
892	100	8	6½	9⅞	14½	303	375	Ermine
893	100	12	6½	9⅞	19¾	411	385	Erudite
894	115	4	7	10⅝	10	239	385	Esteem
895	115	6	7	10⅝	12½	297	390	Everglade
896	115	8	7	10⅝	15	364	395	Excelsior
897	115	12	7	10⅝	20	489	405	Expert
898	130	4	7½	11⅜	10½	281	405	Extolled
899	130	6	7½	11⅜	12¾	348	410	Explicit
900	130	8	7½	11⅜	15½	425	415	Facade
901	130	12	7½	11⅜	20½	569	425	Facile
902	150	4	8	12⅛	10½	318	415	Farina
903	150	6	8	12⅛	12¾	396	420	Fashion
904	150	8	8	12⅛	15½	482	425	Federal
905	150	12	8	12⅛	20½	645	435	Feldspar
906	170	4	8½	12⅞	10½	359	425	Fern
907	170	6	8½	12⅞	12¾	458	430	Firmament
908	170	8	8½	12⅞	15½	544	435	Fitting
909	170	12	8½	12⅞	20½	728	445	Flotilla
910	190	4	9	13⅝	10½	403	430	Forest
911	190	6	9	13⅝	12¾	491	440	Forte
912	190	8	9	13⅝	15½	609	455	Fortress
913	190	12	9	13⅝	20½	817	480	Fortune
914	235	4	10	15⅛	10½	498	460	Freedom
915	235	6	10	15⅛	12¾	619	475	Fresco
916	235	8	10	15⅛	15½	752	490	Frontier
917	235	12	10	15⅛	20½	1007	530	Fulmar
918	285	4	11	16⅝	11	615	490	Fairness
919	285	6	11	16⅝	13½	754	510	Galaxy
920	285	8	11	16⅝	16	907	530	Galena
921	285	12	11	16⅝	21	1201	580	Gallant
922	340	4	12	18⅛	11	756	520	Garland
923	340	6	12	18⅛	13½	929	550	Garnet
924	340	8	12	18⅛	16	1122	580	Garnish
925	340	12	12	18⅛	21	1487	630	Garrison
926	400	4	13	19⅝	11	889	570	Gazelle
927	400	6	13	19⅝	13½	1092	600	Gem
928	400	8	13	19⅝	16	1317	630	Genius
929	400	12	13	19⅝	21	1746	680	Gentian
930	460	4	14	21⅛	11	1031	620	Genuine
931	460	6	14	21⅛	13½	1268	650	Glacier
932	460	8	14	21⅛	16	1558	680	Gloaming
933	460	12	14	21⅛	21	2024	730	Golden
934	530	4	15	23	11	1185	660	Gondola
935	530	6	15	23	13½	1456	695	Grange
936	530	8	15	23	16	1755	730	Granite
937	530	12	15	23	21	2325	780	Graphite

Discounts.....

UNIVERSAL DOUBLE PUMP JACK WITH STANDARD LENGTH INDEPENDENT CYLINDER AND RAM

This type of jack is intended for general lifting or pressing wherever it is necessary or advantageous to separate the cylinder and ram from the force pump. The cylinders and rams are of the standard length and are capable of lifting a live load the full runout of the jack.

Gauges showing pressure per square inch in pounds, and total pressure on the ram in tons, and provided with a safety check valve, will be furnished, attached, for $25.00, net, extra.

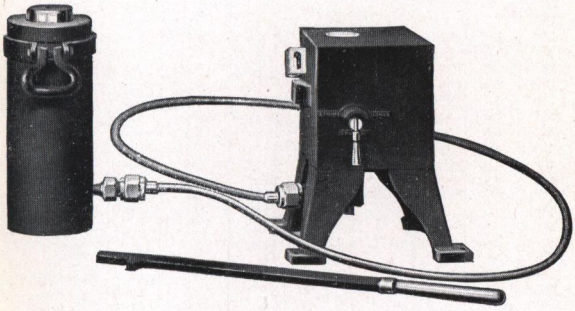


Fig. 571

For additional information, see Circular No. 48.

No.	Lift Tons	Run Out In.	Diam. of Ram Inches	Diameter of Cylinder Inches	Height of Jack with Ram down Inches	Weight of Cylinder and Ram Pounds	Price	Code
950	40	4	4	6⅛	11½	90	$280	Hawthorn
951	40	6	4	6⅛	14	112	285	Hazel
952	40	8	4	6⅛	16	129	290	Hearty
953	40	12	4	6⅛	21	165	300	Heather
954	50	4	4½	6⅞	11½	113	300	Helmet
955	50	6	4½	6⅞	14	140	305	Helpful
956	50	8	4½	6⅞	16	161	310	Hemlock
957	50	12	4½	6⅞	21	213	320	Herald
958	60	4	5	7⅜	12	144	320	Hermit
959	60	6	5	7⅜	14½	179	325	Hickory
960	60	8	5	7⅜	16½	206	330	Highland
961	60	12	5	7⅜	21½	267	340	Highway
962	70	4	5½	8⅜	12	184	340	Homestead
963	70	6	5½	8⅜	14½	230	345	Impact
964	70	8	5½	8⅜	16½	264	350	Imperial
965	70	12	5½	8⅜	21½	342	360	Implicit
966	85	4	6	9⅛	12	205	360	Index
967	85	6	6	9⅛	14½	256	365	Indigo
968	85	8	6	9⅛	16½	293	370	Industry
969	85	12	6	9⅛	21½	382	380	Infantry
970	100	4	6½	9⅞	12½	252	380	Inland
971	100	6	6½	9⅞	15	310	385	Inlet
972	100	8	6½	9⅞	17	355	390	Insignia
973	100	12	6½	9⅞	22	457	400	Institute
974	115	4	7	10⅝	12½	299	400	Intrinsic
975	115	6	7	10⅝	15	356	405	Iris
976	115	8	7	10⅝	17	412	410	Island
977	115	12	7	10⅝	22	538	420	Isthmus
978	130	4	7½	11⅜	12½	334	420	Ivory
979	130	6	7½	11⅜	15	409	425	Jasmine
980	130	8	7½	11⅜	17	466	430	Jasper
981	130	12	7½	11⅜	22	611	440	Jingle
982	150	4	8	12⅛	13	394	430	Jonquil
983	150	6	8	12⅛	15½	481	435	Journey
984	150	8	8	12⅛	17½	544	440	Jovial
985	150	12	8	12⅛	22½	708	450	Jubilee
986	170	4	8½	12⅞	13	444	440	Justice
987	170	6	8½	12⅞	15½	556	445	Juvenile
988	170	8	8½	12⅞	17½	614	450	Justify
989	170	12	8½	12⅞	22½	799	460	Kaiser
990	190	4	9	13⅝	13½	518	450	Kavlin
991	190	6	9	13⅝	16	616	460	Keystone
992	190	8	9	13⅝	18	707	475	Kindred
993	190	12	9	13⅝	23	916	500	King
994	235	4	10	15⅛	14	664	480	Knight
995	235	6	10	15⅛	16½	801	495	Keeness
996	235	8	10	15⅛	18½	897	510	Kirmesss
997	235	12	10	15⅛	23½	1154	550	Kindness
998	285	4	11	16⅝	14½	811	510	Kinglike
999	285	6	11	16⅝	17	949	530	Kirk
1000	285	8	11	16⅝	19	1077	550	Knighthood
1001	285	12	11	16⅝	24	1372	600	Knowledge
1002	340	4	12	18⅛	15	1030	540	Kohinoor
1003	340	6	12	18⅛	17½	1204	570	Labyrinth
1004	340	8	12	18⅛	19½	1367	600	Lacquer
1005	340	12	12	18⅛	24½	1734	650	Lacrosse
1006	400	4	13	19⅝	15	1212	590	Ladder
1007	400	6	13	19⅝	17½	1415	620	Landau
1008	400	8	13	19⅝	19½	1604	650	Landscape
1009	400	12	13	19⅝	24½	2036	700	Lantern
1010	460	4	14	21⅛	15½	1453	640	Larch
1011	460	6	14	21⅛	18	1690	670	Larkspur
1012	460	8	14	21⅛	20	1948	700	Lattice
1013	460	12	14	21⅛	25	2409	750	Launch
1014	530	4	15	23	16	1723	680	Laureate
1015	530	6	15	23	18½	1995	715	Laurel
1016	530	8	15	23	20½	2248	750	Lavender
1017	530	12	15	23	25½	2823	800	League

Discounts----------

UNIVERSAL DUPLEX LONG LIFT JACK WITH DOUBLE PUMP CISTERN PRESSURE PUMP

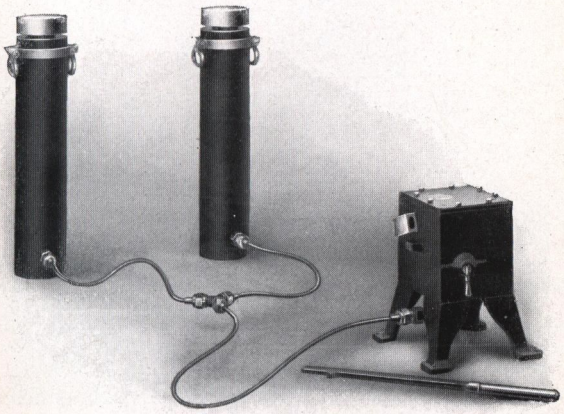


Fig. 572

Fig. 572 shows a Universal Hydraulic Duplex Long Lift Jack with double pump cistern pressure pump connected to the cylinders and rams by means of flexible tubing.

This type of jack is especially intended for pulling oil well pipe, driving down caissons, and in other work where it is necessary or advantageous to have two jacks operated together.

Made in all sizes. Prices upon application.

For further particulars, see Circular No. 51.

UNIVERSAL
DOUBLE PUMP SELF-CONTAINED
BRIDGE LIFTING JACK

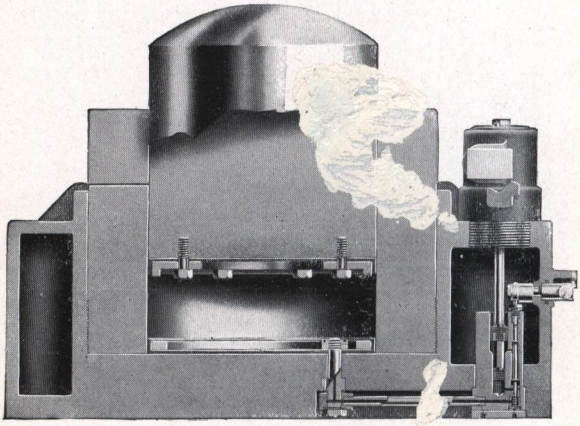


Fig. 573

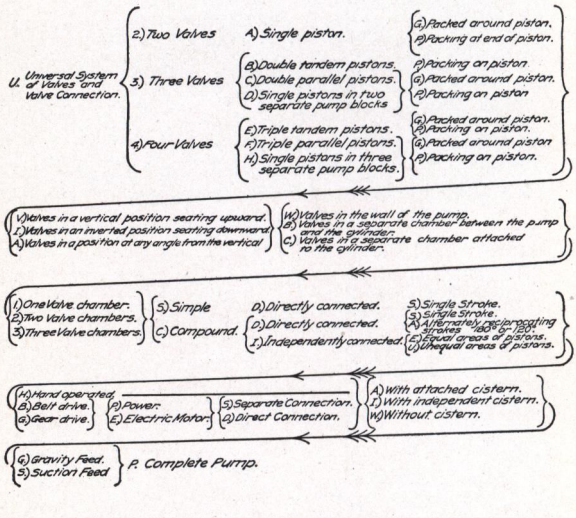
No.	Lift Tons	Run Out Inches	Diameter of Ram Inches	Height of Jack with Ram down Inches	Price	Code
1130	100	12	6½	24	Prices on Application	Rosemary
1131	125	12	7½	24½		Rocket
1132	150	12	8	25		Rosace
1133	200	12	9	25½		Rosadero
1134	250	12	10	26		Rosalia
1135	300	12	11	26½		Roseate
1136	350	12	12	27		Roselite
1137	400	12	13	27½		Rosette
1138	450	12	14	28		Rosewood
1139	500	12	15	28½		Rosterite
1140	550	12	15½	29		Rostrum
1141	600	12	16	29½		Ruby

For additional information, see Circular No. 53.

UNIVERSAL HYDROSTATIC PRESSURE PUMPS

THE UNIVERSAL HYDROSTATIC PRESSURE PUMPS

Because of the flexible nature of the system of valves employed in the Universal hydraulic jacks which have been described, it is possible to use this system to advantage in a great variety of pressure pumps. This system is equally successful when applied to single, double or triple pumps; to single-acting, duplex or triplex pumps; to hand-operated, belt-driven and gear-driven pumps; to pumps with the valves in the usual position, or inverted; to pumps with packings on the pistons, and to pumps with packings around the pistons; to pumps with independent reservoir, and without reservoir; to pumps with suction feed and with gravity feed; in fact, in every way the valves can be used.


U. Universal System of Valves and Valve Connection.
2) Two Valves
A) Single piston.
G) Packed around piston.
F) Packing at end of piston.
3) Three Valves
B) Double tandem pistons.
C) Double parallel pistons.
D) Single pistons in two separate pump blocks.
F) Packing on piston.
G) Packed around piston.
F) Packing on piston
4) Four Valves
E) Triple tandem pistons.
F) Triple parallel pistons.
H) Single pistons in three separate pump blocks.
G) Packed around piston.
F) Packing on piston.
G) Packed around piston
F) Packing on piston.
V) Valves in a vertical position seating upward.
I) Valves in an inverted position seating downward.
A) Valves in a position at any angle from the vertical
W) Valves in the wall of the pump.
B) Valves in a separate chamber between the pump and the cylinder.
C) Valves in a separate chamber attached to the cylinder.
1) One Valve chamber.
2) Two Valve chambers.
3) Three Valve chambers.
S) Simple
C) Compound.
D) Directly connected.
O) Directly connected.
I) Independently connected.
S) Single Stroke.
D) Single Stroke.
A) Alternately (as in opposing strokes "double acting").
E) Equal areas of pistons.
U) Unequal areas of pistons.
H) Hand operated.
B) Belt drive.
G) Gear drive.
P) Power:
E) Electric Motor.
S) Separate Connection.
D) Direct Connection.
A) With attached cistern.
I) With independent cistern.
W) Without cistern.
G) Gravity Feed.
S) Suction Feed
P. Complete Pump.

The above diagram shows some of the different combinations which may be arranged for this system of valves, and at the same time the different factors entering into the design of an ordinary pump. The first bracketed space shows the number of valves used, which may be either two, three, or four. Then follows the arrangement of the pistons. This diagram shows the various positions and locations in which

the valves may be placed, the number of chambers, and the other particulars that enter into the construction of a pump.

Only a few of the many possible pumps are described, but other types can be readily designed, and it is intended to pay particular attention in the future to the construction of both hand and power operated pumps.

There are many purposes for which pressure pumps are required. Among the more important are the testing of boilers, high pressure mains and tanks, the discovering of leaks, and the operating of rams for various purposes.

The construction and operation of several of the pumps in this catalogue are described.

The first type of pump is that shown by Fig. 574. This pump is a modification of the pump used in the Universal jacks which have been described. This pump is remarkable for the power it affords in so small a compass. It is intended particularly to be used by traveling engineers or erectors for testing purposes.

The pump stands 12½ inches over all; the outside diameter of the barrel is 3½ inches, the length of the operating handle is 16½ inches and it weighs only 30 pounds, thus being readily portable in a mechanic's or engineer's kit.

The pump is designed for working pressures up to 1500 pounds, although it is actually capable of much higher pressures. The testing pump is a compound one, having two pistons, the larger one being double the area of the smaller one, so that for the same pressure exerted on the operating lever two pressures may be obtained. The volume of discharge in each case is, of course, in inverse proportion to the delivered pressure. In using the pump for the first few strokes to fill the void in the vessel or system under test, the lower pressure is desired; then a change in the valve control gives the higher pressure for the final testing.

The pump draws its supply of liquid through a rubber hose attached to the nipple at the upper right side of the barrel, as seen in cut, the other end of the hose being allowed to dip into a pail or other receptacle of water or whatever liquid may be employed. The discharge is from the outlet at the lower end of the same side of the barrel, where a union is provided to make a tight joint with the pipe leading to the apparatus under test. During the up stroke of the plunger

the liquid is drawn by suction into the chamber at the top of the barrel, and passes around the valves and to the lower sides of the two pistons. On the down stroke the upper valve is forced to its seat, and the discharge takes place through the passages around the valves to the discharge outlet. This is the condition when the lower pressure is obtained, and at such times the valve controlling handle is swung to a position at right angles to that indicated.

The handle is connected with a shaft carrying a cam, which when the handle is in the vertical position, as shown in cut, forces the upper valve from its seat. Under such conditions the up stroke of the plunger produces the same effect as before, but on the down stroke the discharge which takes place from the lower side of the upper piston simply returns to the suction chamber, the upper valve at this time being idle, the middle valve acting as the suction valve, while the lower valve is the discharge valve. All of the pressure exerted is then produced by the lower piston, the course of the liquid being, as before, around the lower valve and out through the discharge outlet. When the valve handle is revolved to the other horizontal extreme of its movement, all the valves are forced from their seats so that the liquid is admitted back through the discharge, relieving the pressure.

The pump is noted for the simplicity of its valve arrangement, there being only these three valves, which are all in one passage. Therefore communication between the discharge and inlet at times when the pump is at rest is blocked by three valves in tandem, which make leakage back to the supply chamber practically impossible. These three valves serve all purposes of suction, discharge and relief, there being no need of an extra valve to relieve the pressure, which would necessitate a passage between the discharge and inlet protected by only one valve.

The accessibility of the interior parts is a feature of importance and interest. The valves and cylinders may be removed as a unit by unscrewing the plate at the bottom of the shell, and the plunger and pistons may be withdrawn intact by unscrewing the gland at the top under the head to which the operating lever connects. The packing of either piston may be removed by unscrewing the parts, which are separable. All three of the valves are reached by unscrewing the plug at the bottom of the valve packing. The cam is

reversible, so that if one side becomes worn, it can be inverted and the opposite side used.

The parts are few, there is nothing delicate in the construction, and almost no care or attention is required in the use of the pump. It is entirely self-contained, and in this respect is probably the first device of its kind that has ever been offered.

The pump shown by Fig. 576 is intended for a higher pressure than has just been described, for with one man at the lever it will exert a pressure of 6000 pounds to the square inch.

This type of pump was designed for use where the service is unusually severe and where it is either inconvenient or impossible to use a pump with valves seating upward in the usual manner.

This is a single pump and consists of an iron base, to which is bolted a hydraulic metal pump body containing the valve and piston chambers. It receives its supply of liquid through the pipe, shown on side of cut, usually by means of a rubber hose. All sediment or grit which usually impairs the efficiency of hydraulic pumps, is caught in the sediment chamber at the bottom of the valves. This chamber may be easily cleaned by unscrewing the plug which serves as a bearing for the cam shaft. The piston is supported and guided at the top by means of a composition metal gooseneck, which may be easily removed and replaced when desired by anyone without danger of getting it out of line—a danger with many devices of this nature. The packing consists of leather rings surrounding the piston and held in place and in contact with the piston by means of a steel gland.

The operation is as follows: When the piston is raised in pumping, a vacuum is created in the piston chamber and the liquid in the source of supply flows through the pipe or tube into the sediment chamber, then up past the valve and into the piston chamber. The downward stroke of the piston closes the lower valve, and the liquid then forces the upper valve from its seat and flows along a suitable connecting pipe to the pressure chamber. When it is desired to release the pressure the valve handle is turned up until the cam on the end of the cam shaft unseats the lower valve, and it, in turn, the upper valve, and both are held continuously from their seats until they are allowed to close by gravity, when the valve handle has been turned horizontally to the left.

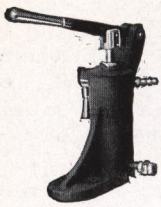


Fig. 574

There are many purposes for which a small portable hand-power hydraulic pump capable of exerting great pressure is serviceable. Among the more important are the testing of boilers, high-pressure mains and tanks, etc., to discover leaks, while aside from testing purposes there are other useful applications of such a pump as a means of operating a tool, or exerting pressure through a hydraulic cylinder.

The pump shown by cut is designed for working pressures up to 1500 pounds, although it is actually capable of much higher pressures.

The parts are few, and there is nothing delicate in the construction, so that almost no care or attention is required in the use of the pump. It is entirely self-contained, and in this respect is probably the first device of its kind that has ever been offered. Price, $16.00.

For additional information, see Circular No. 12. Discounts.....

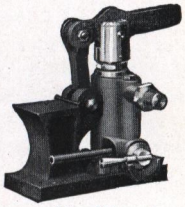


Fig. 575

This pump was designed for sinking small caissons under foundation piers, and in driving small shields in the construction of subways in New York City, where the nature of the work made it practically impossible to prevent the entrance of sand and grit, and gave better satisfaction than anything that had before been used. Price, $45.00.

For additional information, see Circular No. 58. Discounts.....

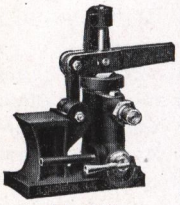


Fig. 576

This is a single pump, and consists of an iron base, to which is bolted a hydraulic metal pump body containing the valve and piston chambers. It receives its supply of liquid through the pipe, shown on side of cut, usually by means of a rubber hose. All sediment or grit is caught in the sediment chamber at the bottom of the valves. This chamber may be easily cleaned by unscrewing the plug which serves as a bearing for the cam shaft. The piston is supported and guided at the top by means of a composition metal gooseneck, which may be easily removed and replaced when desired without danger of getting it out of line, which is the case in many devices of this nature. The packing consists of leather rings surrounding the piston and held in place by means of a steel gland. Price, $50.00

For additional information, see Circular No. 57. Discounts.....

THE UNIVERSAL DOUBLE PUMP CISTERN PRESSURE PUMP

The two types of pumps which have just been described do not include reservoirs, but draw their supply of liquid by suction from a tank. The Universal Double Pump Cistern Pressure Pump, Fig. 577, is provided with a reservoir, and obtains its supply of liquid by gravity.

The pump has two pistons, the larger one being three times the area of the smaller one, so that for the same pressure exerted upon the operating lever two pressures may be obtained. The volume of discharge in each case is, of course, in inverse proportion to the applied pressure. Thus the lighter pressure may be obtained with triple the speed of the higher pressure, which is an advantage in the saving of time. When it is desired to throw out the auxiliary pump, the valve handle, showing in front of the cistern, is given a quarter turn, which produces the action of a single pump jack.

This pump is designed to exert a pressure of 2000 pounds to the square inch with two pumps in operation, and 6000 pounds to the square inch with one pump in operation. It can, however, be made to work at any pressure required.

To remove the valves, unscrew the bonnet at the bottom of the pump.

To remove the pistons, unscrew the plate at the top of the cistern, and the pistons may be lifted through the opening.

To remove the pump, unscrew the retaining ring, and the pump will drop out.

The legs are detachable and are interchangeable.

The valves are so located in the pump that all of the fluid in the cistern is available. If more fluid is required it may be either poured into the cistern or allowed to flow in by means of a siphon or other arrangement.

Gauges showing pressure per square inch in pounds, and total pressure on the ram in tons, and provided with a safety check valve, will be furnished, attached, for $25.00, net, extra.

For additional information, see Circular No. 19.

Discounts.....

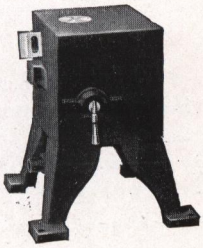


Fig. 577

UNIVERSAL HYDRAULIC TRIPLE PUMP CISTERN PRESSURE PUMP

The Universal triple pump cistern pressure pump is a modification of the pump last described, in that it has triple pumps instead of double pumps. Its general appearance is the same as Fig. 577. There are many purposes for which such a hand-power pump giving a great variety of pressure is valuable, as for making tests or for the operation of variable pressure hydraulic presses, etc. This is the only triple pump on the market.

This pump may be furnished to give any combination of pressures required, as, for example, a pressure of 1000 pounds to the square inch with the three pumps in operation, 3000 pounds with two pumps in operation, and 6000 pounds with but one pump in operation. Price, $75 00.

For additional information, see Circular No. 21.

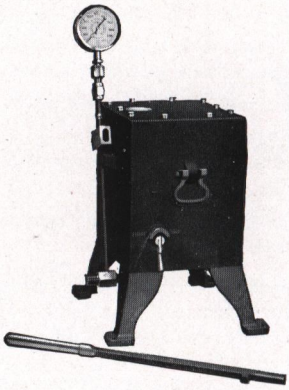


Fig. 579

This pump may also be obtained with an extra large cistern. This cistern measures 24 inches in height and occupies 19 x 20 inches floor space. The reservoir contains 10 gallons. See Fig. 579. Price, without gauge, $100.00. Price, with gauge, $125.00.

For additional information, see Circular No. 20.

Discounts.....

UNIVERSAL HYDROSTATIC POWER PRESSURE PUMPS

POWER PUMPS

It is sometimes necessary to use a power-driven pump for high-pressure work. Fig. 580 shows an exterior view of a belt-driven pump of very small size, capable of giving a high pressure. This pump is self-contained and portable. It measures 24 inches high, 22 inches wide, including both the tight and loose pulleys, and weighs 360 pounds. The cover is bolted down against a ring gasket in order to permit connection of the cistern with a service pipe, so that boilers and

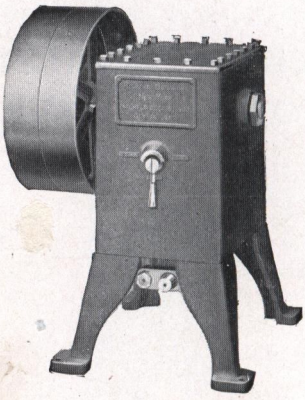


Fig. 580

other vessels can be filled through the pump. After the container has been entirely filled by this means, the pump can be used in obtaining the pressure desired.

Fig. 581 shows a section of this pump. There are two pumps, each pump is double, and operated by an eccentric keyed on the shaft. A double plunger pump has the advantage that, while the discharge fluctuates from zero to a maximum and back to zero each stroke, the discharge is not arrested for any appreciable time.

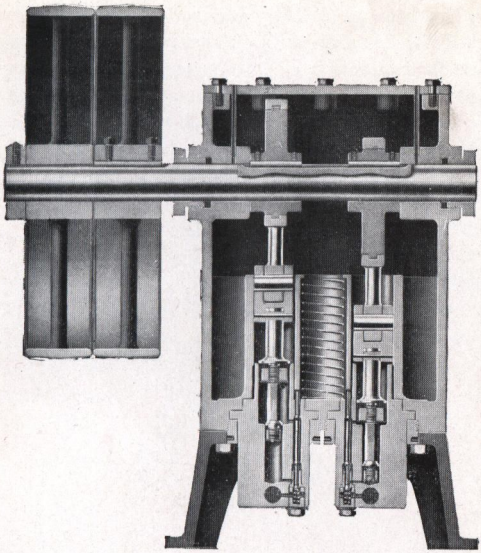


Fig. 581

For additional information, see Circular No. 6[illegible]

Fig. 582 shows a motor-driven triple plunger pressure pump with the valves located in a separate chamber between the cylinder and the pump, and under the control of an operator in a position to see the progress of the work. This type of

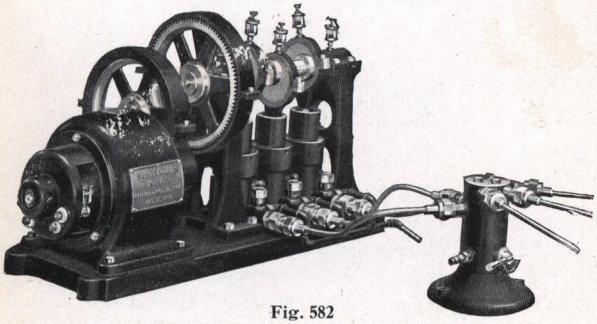


Fig. 582

For additional information, see Circular No. 63.

pump has been particularly designed for forcing down small caissons in foundation work. The three plungers are mounted on one shaft at angles of 120 degrees. The pumps consist of a solid plunger working in a block and with a gland packing, connected by a copper tube with a valve-block, the details of which can be seen by Fig. 583. It will be noticed by this

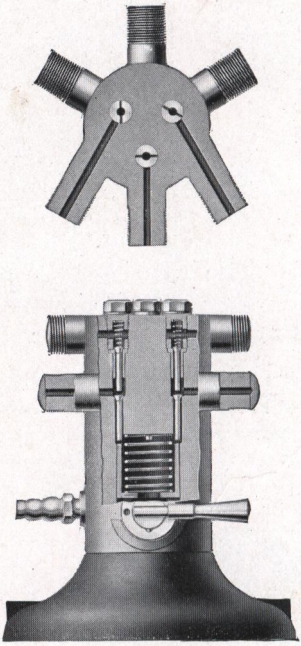


Fig. 583

view that there are three valve chambers, each provided with a connection which leads directly to its own piston chamber, and that these valve bores are arranged in the shape of an equilateral triangle. The principle of the push-tube is used in this case so that the valves may all be lifted from their seats at one time. The upper valves are made of different

lengths, to permit the throwing-out of one pump before the others. The operator, by turning the valve handle can, therefore, stop one pump or two pumps, and by pressing all *three* upper valves, stop all three pumps from effective operation. When the pressure is to be relieved, the valve handle is turned still further by the operator, which causes the longest valve to open the pressure valve above it, the intermediate length valve then opens the second valve, and finally the shortest valve opens its pressure valve. This not only allows the gradual reduction of pressure in the pressure chamber, but it reduces the effort required to open the valves. If desired, the chamber containing these valves can be attached directly to the cylinders. It is possible to arrange these valves to seat as shown, or they may be reversed. In fact, the valves may be placed in any position. They may be located in a Y or coupling, which would be allowed to lie on the ground in any position.

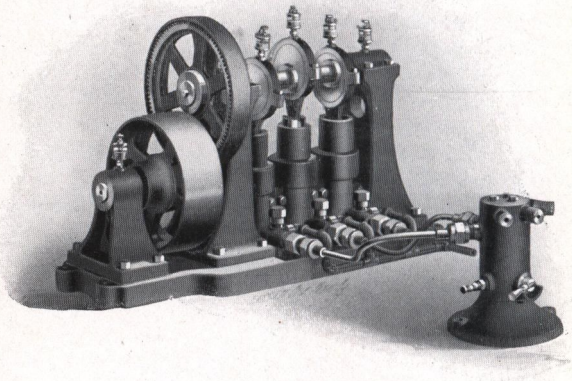


Fig. 584

Fig. 584 shows a belt-driven triple plunger pressure pump of the same type as is shown by Fig. 582. This is especially adapted for factory use where the power can be taken from a shaft instead of an electric motor.

Code: Lexicon

Prices upon application

For further particulars, see Circular No. 64.

HYDRAULIC PUNCHES

HYDRAULIC HEAD PUNCH

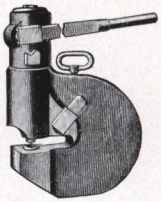


Fig. 585

The head punch (so called, as it has a head like the jack), is a great improvement upon the hydraulic screw punch. It will do double the work in the same time, will keep in repair many times as long, and is much more easily packed. It is fitted with a pinon meshing into a rack cut on the ram, to withdraw punch from metal after punching. This has since become generally adopted.

REGULAR SIZES

No.	Thickness In.	Riv't In.	*Gap In.	Weight Pounds	Price	Code	*Gap In.	Weight Pounds	Price	Code
10	¼	⅝	2	50	$70	Kedge	3½	55	$80	Knell
11	⅜	⅝	2	65	80	Ketch	3½	70	90	Knife
12	½	⅝	2	70	100	Knack	3½	105	110	Knock
13	½	¾	2	85	120	Knarl	3½	110	130	Knoll
14	⅝	¾	2	110	150	Knave	3½	140	170	Knout
15	¾	⅞	2	150	200	Knead	3½	180	220	Knurl
17	1	1	2	280	250	Kneel	4	350	275	Known

*Gap refers to distance from edge of sheet to center of hole. Greater depth of gap to order.

Discounts.....

HYDRAULIC SCREW PUNCH

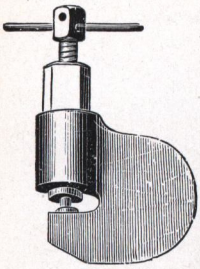


Fig. 586

This punch is so well known to the trade that a description is unnecessary; it is and has been in very general use with most boiler makers, bridge builders, etc., for years. All genuine Dudgeon punches are made from solid steel forgings.

In ordering screw punches, prefix word Screw to code word of Head Punch. Prices and discounts same as on head punches.

SPECIAL HYDRAULIC HEAD PUNCHES

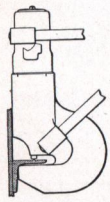


Fig. 587

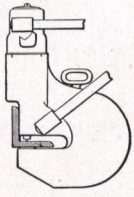


Fig. 588

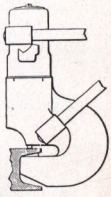


Fig. 589

The above cuts show a few of a great variety of shapes for special work and are operated in the same manner as those on preceding page. Prices given on application.

RAIL PUNCHES

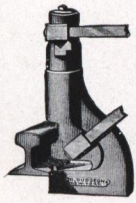


Fig. 590

Spike Punch

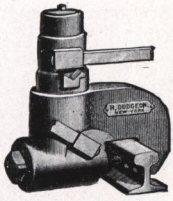


Fig. 591

Fish Plate Punch

Prices on application

BEAM PUNCH

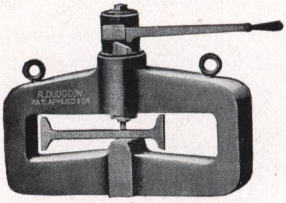


Fig. 592

No.	Beam Inches	Thickness Inch	Rivet Inch	From Center of Punch to Side, Inches	Weight Pounds	Price	Code
21	12	½	¾	17¼	450	$225	Label
22	15	1	1	12¼	575	275	Laird
23	20	1	1	9¼	750	325	Lance

These punches are made from a solid steel forging, without weld, and are operated the same as the hydraulic jack. The ram returns itself when the socket is hard down on the lug.

PUNCHES AND DIES FOR DUDGEON PUNCHES

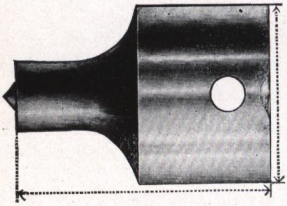


Fig. 593

No.	Diameter Inches	Height Inches	Sizes Inch	Price
1	1⅜	1⅝	¼ to ¾	$1.50
2	1⅜	2	¼ to ⅞	1.50
3	1⅝	2¾	½ to 1	2.00

No.	Diameter Inches	Height Inches	Sizes Inch	Price
1	1⅜	1	¼ to ¾	$1.50
2	1⅝	1⅛	¼ to ⅞	1.50
3	2	1¼	½ to 1	2.00

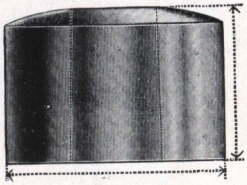


Fig. 594

In ordering punches and dies give, number as shown in first column or diameter of shank of punch or outside diameter of die, and size of rivet or bolt for which holes are to be punched.

Discounts.....

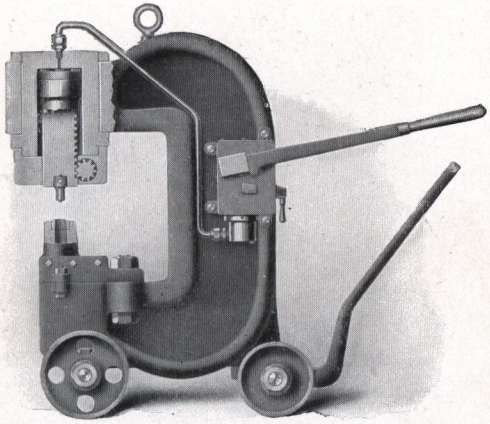


Fig. 595

Fig. 595 shows the only double pump hydraulic punch on the market. This punch is especially adapted for punching I-beams, angles, and other structural steel parts. A rack and pinion is used to force the ram back into the cylinder after it has been extended, and it is also used to run the ram down to the work without the labor of pumping it down, the fluid with which the pump is charged filling the cylinder behind the ram by suction as it is withdrawn, and making it possible to commence pumping against pressure with the first stroke of the lever. The first pressure may be obtained, or light work may be punched, by using two pumps together; a quarter turn of the valve handle then throws out the auxiliary pump and one pump only is then used.

Code: Cean

Prices upon application

R. DUDGEON'S HYDROSTATIC JACK PRESSES

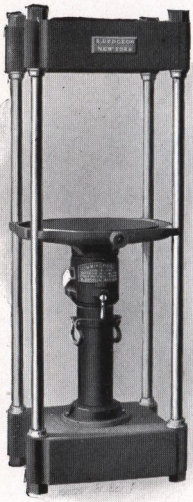


Fig. 596

Fig. 596 shows a hydrostatic press with middle platen provided with gutter, and using a Universal Plain Jack same as shown on page 36.

Code: Cembalo

Fig. 597 shows a hydrostatic press with middle platen provided with gutter and with a curb and follower.

Code: Ceorl

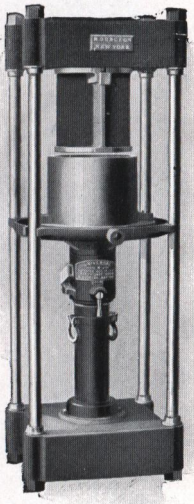


Fig. 597

Prices furnished upon application. In writing for prices give dimensions of platens, runout and capacity of jack, and distance between middle and upper platens when the ram is down.

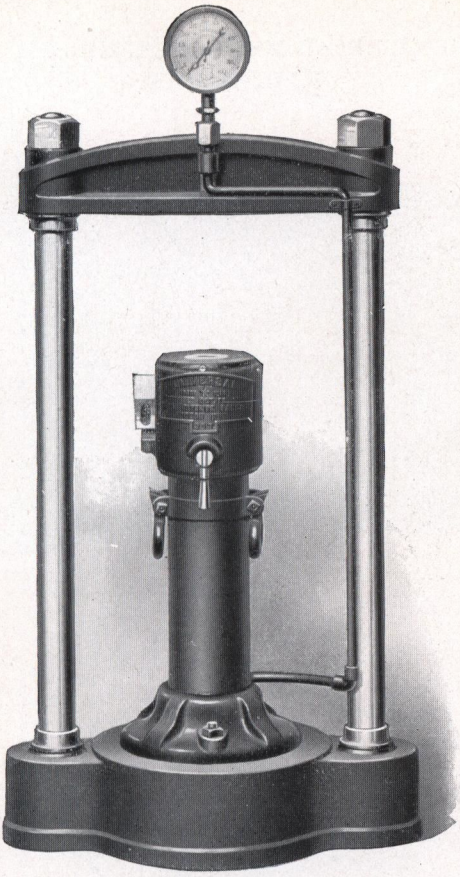


Fig. 598

HYDRAULIC TESTING PRESS WITH GAUGE

Fig. 598 shows a 30-ton Universal Railroad Base Jack, same as shown on page 37, in a press frame, and provided with a gauge registering the pressure in tons, and in pounds per square inch on the ram. This is a simple form of a press, and is easily adaptable to many uses. Press frames of similar types can be made with steel I-beams and suitable bolts, which may be used either for pressing purposes or especially for testing hydraulic jacks and setting up their packings.

Code: Celosia. Prices upon application

For additional information, see Circular No. 66.

UNIVERSAL HYDRAULIC GIRDER RAIL BENDER

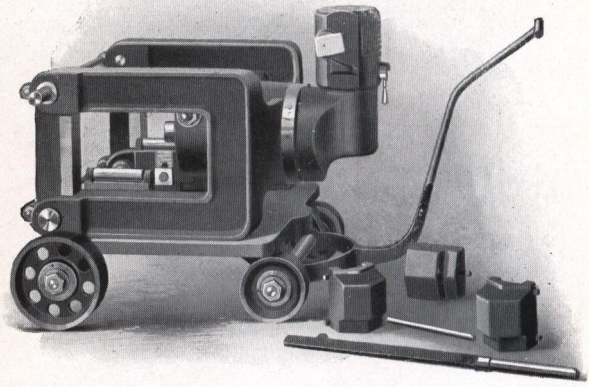


Fig. 599

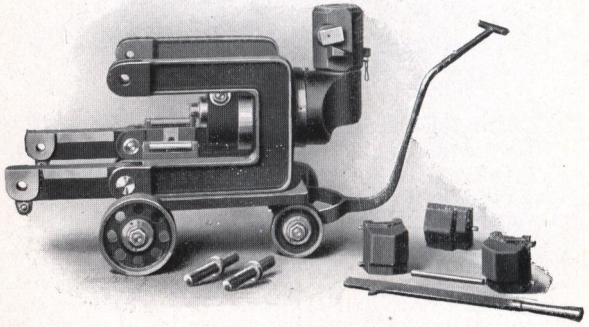


Fig. 600

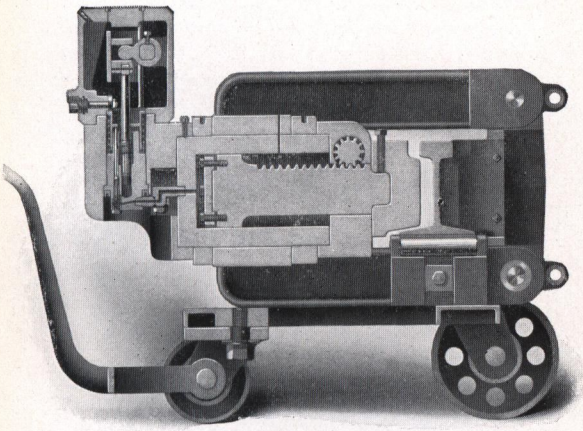


Fig. 601

Figs. 599, 600 and 601 show perspective and sectional views of the Universal Hydraulic Double Pump Girder Rail Bender. In this rail bender a rack and pinion is used to force the ram back into the cylinder after it has been extended. It may also be used to run the ram out against the rail without the labor of pumping it out, the fluid with which the reservoir is charged filling the cylinder behind the ram by suction as it is withdrawn, and making it possible to commence pumping against pressure with the first stroke of the lever. This bender is provided with the Universal double pump, as is shown by sectional view, Fig. 601. The use of two pumps together provides a high rate of speed for light work, and by turning the valve handle down, in the position shown by Fig. 599, the auxiliary pump is thrown out and the high pressure pump only is used.

This bender is made where possible with standard jack parts, and is operated at the same pressure as the Universal jacks. This being the case, the bender may be repaired and the valves and packings replaced by anyone familiar with hydraulic jacks. This also does away with the necessity of carrying spare parts for the bender, as jack parts are used.

It is necessary to have a sketch showing section of largest rail to be bent when quoting price.

Prices upon application

Code: Lucid

For additional information, see Circular No. 80

ROLLER TUBE EXPANDERS

ROLLER TUBE EXPANDER

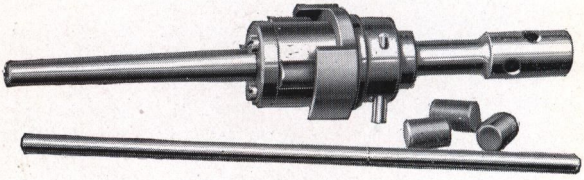


Fig. 602

Size Inches	Price	Code	Size Inches	Price	Code
1	$10.00	Nabob	3	$39.00	Night
1¼	12.00	Nadir	3¼	44.00	Noble
1½	13.00	Naive	3½	48.00	Noise
1¾	15 00	Naval	4	58.00	Nomad
1⅞	17.00	Navy	4½	60.00	Noose
2	20.00	Neigh	5	75.00	North
2¼	25.00	Nave	6	90.00	Nudge
2½	29.00	Newel	7	110.00	Notch
2¾	34.00	Niece			

Discounts.....

PARTS FOR ROLLER TUBE EXPANDERS

Size Inches	Mandrels Each	Rollers Each	Size Inches	Mandrels Each	Rollers Each
1	$1 00	$0.20	2¾	$3.00	$0.30
1¼	1.25	.20	3	3 50	.35
1½	1.50	.20	3¼	3.50	.35
1¾	1.75	.25	3½	4.00	.40
1⅞	1.75	.25	4	4.50	.45
2	2 25	.25	4½	4.50	.50
2¼	2.50	.25	5	5.00	.60
2½	3.00	.30	6	6.00	.75

These dimensions refer to the external diameter of tube.

Discounts.....

COMPOUND ROLLER TUBE EXPANDER

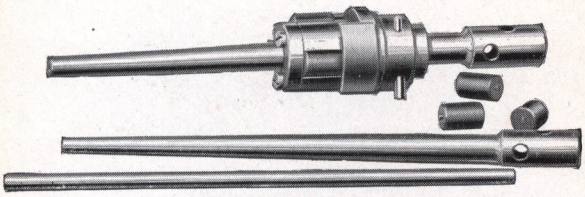


Fig. 603

Will expand two sizes up to two inches, and three sizes above, as shown on list.

Size, Inches	Price	Code	Size, Inches	Price	Code
1⅝ and 1¾	$20.00	Oasis	3½, 3⅝ and 3¾	$65.00	Oread
1¾ and 1⅞	22.00	Occur	3¾, 3⅞ and 4	70.00	Orion
1⅞ and 2	25.00	Ocean	4, 4⅛ and 4¼	75.00	Orlop
2, 2⅛ and 2¼	30.00	Ochre	4¼, 4⅜ and 4½	80.00	Oriel
2¼, 2⅜ and 2½	35.00	Olive	4½, 4⅝ and 4¾	85.00	Orris
2½, 2⅝ and 2¾	40.00	Omega	4¾, 4⅞ and 5	90.00	Otter
2¾, 2⅞ and 3	45.00	Optic	5, 5¼ and 5½	100.00	Ounce
3, 3⅛ and 3¼	52.00	Orbit	5½, 5¾ and 6	110.00	Overt
3¼, 3⅜ and 3½	60.00	Organ	6, 6¼ and 6½	120.00	Owner

Larger sizes made to order

Discounts.....

PARTS FOR COMPOUND TUBE EXPANDERS

Size, Inches	Mandrels		Rollers Each	Size, Inches	Mandrels		Rollers Each
	Large	Small			Large	Small	
1⅝ and 1¾	$1.75	$1.50	$0.25	3¼, 3⅜ and 3½	$3.50	$3.00	$0.40
1¾ and 1⅞	2.00	1.75	.25	3½, 3⅝ and 3¾	4.00	3.00	.45
1⅞ and 2	2.25	1.75	.25	3¾, 3⅞ and 4	4.00	3.50	.50
2, 2⅛ and 2¼	2.25	1.75	.30	4, 4⅛ and 4¼	4.50	3.75	.55
2¼, 2⅜ and 2½	2.50	1.75	.30	4¼, 4⅜ and 4½	4.50	4.00	.60
2½, 2⅝ and 2¾	3.00	2.25	.30	4½, 4⅝ and 4¾	5.00	4.50	.65
2¾, 2⅞ and 3	3.00	2.50	.35	4¾, 4⅞ and 5	5.00	4.50	.75
3, 3⅛ and 3¼	3.50	2.50	.35				

Discounts.....

TUBE EXPANDER FOR WATER TUBE BOILERS

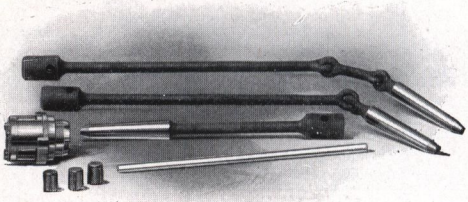


Fig. 604

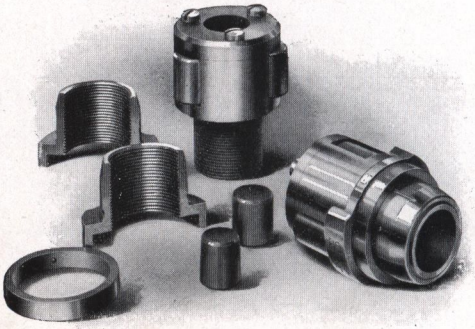


Fig. 605

This expander is intended for expanding the tubes in water tube boilers with four-inch tubes. The small cut shows the entire outfit, which consists of an adjustable guide-ring expander, with one set of straight rollers and an extra set of taper rollers 1½ inches long, and one each straight, single-jointed and double-jointed mandrel and mandrel turning pin. This expander is adjustable to suit different lengths of tubes by means of a split collar, with internal grooves, which engage corresponding grooves cut on the shank of the expander body. This split guide-ring is held in position on the grooves by means of a collar, the removal of which allows the shifting of the guide-ring to any position desired. The larger cut shows an expander with the guide-ring removed; also an expander with the guide-ring in position. The expander is packed in a strong wooden box measuring 33 inches long, 8 inches wide and 5 inches deep; gross weight, 42 pounds; net weight, 36 pounds. Price, $[illegible]. Code: Nautical.

For additional information, see Circular No. 24.

$50.00 net

Discounts.....

HYDRAULIC GAUGES

Gauges for hydraulic pressure are shown by Figs. 606, 607 and 608. All of these cuts show gauges provided with a small hand and dial in the center, which indicates the maximum pressure to which the gauge has registered until the hand is again set at zero. This is accomplished by unscrewing the glass and turning the pointer back with the finger. This is an advantage as it serves to show improper use of the apparatus by overloading.

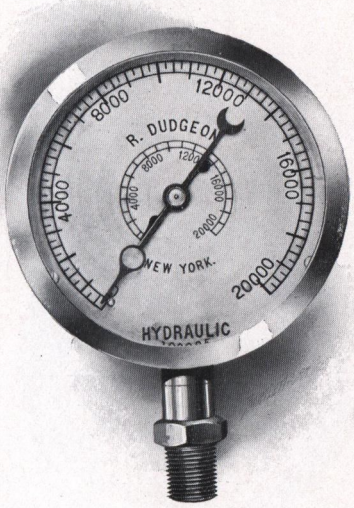


Fig. 606

Fig. 606 illustrates a gauge calibrated to indicate pounds to the square inch

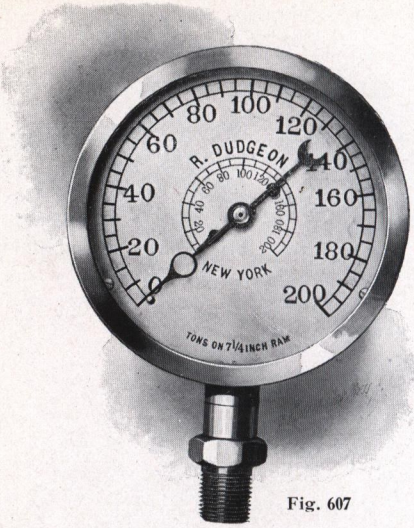


Fig. 607

Fig. 607 illustrates a gauge calibrated to show the pressure in tons upon a ram of a known diameter.

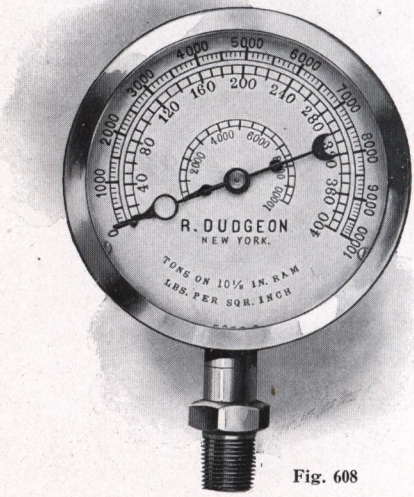


Fig. 608

Fig. 608 illustrates a gauge which registers both the pressure per square inch in pounds and the total pressure in tons upon the ram by the same indicator. Prices upon application.

PARTS FOR JACKS AND PRESSURE PUMPS

COMPONENT PARTS OF THE UNIVERSAL DOUBLE PUMP TEST PUMP

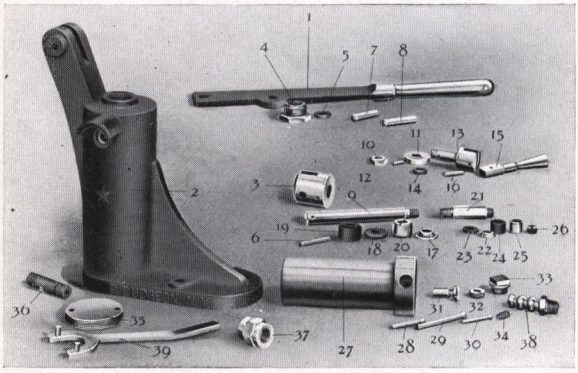


Fig. 609

PRICES OF COMPONENT PARTS OF THE UNIVERSAL DOUBLE PUMP TEST PUMP

1	Lever	$1.00
2	Main Case	3.00
3	Piston Head	.50
4	Piston Gland	.50
5	Piston Gland Packing Ring	.02
6	Piston Retaining Pin	.10
7	Lever Fulcrum Pin	.10
8	Lever Pin	.10
9	Piston	.50
10	Cam Shaft Nut	.10
11	Cam	.25
12	Cam Pin	.10
13	Cam Shaft	1.00
14	Cam Shaft Packing	.02
15	Valve Handle	.50
16	Valve Handle Pin	.10
17	Large Piston Collar	.15
18	Large Hard Piston Packing	.04
19	Large Piston Cup Packing	.15
20	Large Piston Packing Ring	.15
21	Piston Extension	.50
22	Small Piston Collar	.15
23	Small Hard Piston Packing	.02
24	Small Piston Cup Packing	.10
25	Small Piston Packing Ring	.15
26	Jam Screw	.15
27	Pump	4.00
28	Upper Valve	.10
29	Middle Valve	.25
30	Lower Valve	.10
31	Valve Case	.25
32	Valve Case Bonnet	.10
33	Valve Bonnet	.15
34	Valve Spring	.02
35	Pump Retaining Plate	.50
36	Pump Tube	.25
37	Pump Coupling	.50
38	Intake Connection	.25
39	Pump Retaining Plate Spanner	.50

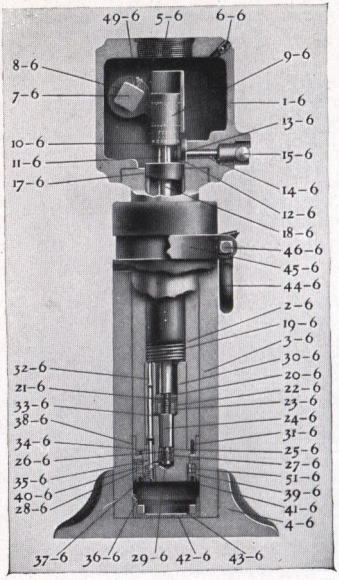


Fig. 610

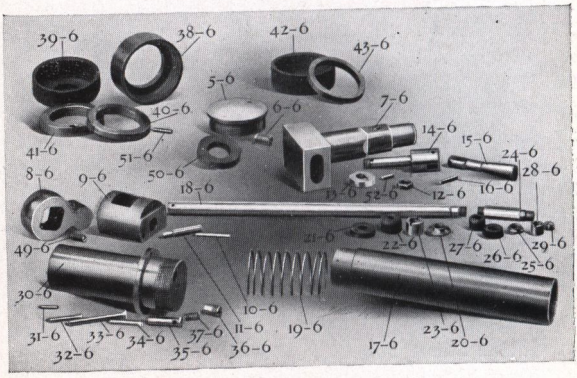


Fig. 611

PRICES OF COMPONENT PARTS OF THE UNIVERSAL JACK

1-6	Head	See list page 117
2-6	Ram	See list page 115
3-6	Cylinder	See list page 112
4-6	R. R. Base	See list page 121
5-6	Head Plate	$ .50
6-6	Air Valve	.15
7-6	Socket	4.00
8-6	Arm	1.00
9-6	Piston Head	1.00
10-6	Piston Retaining Pin	.10
11-6	Lowering Pin	.15
12-6	Cam Shaft Nut	.10
13-6	Cam	.25
14-6	Cam Shaft	1.00
15-6	Valve Handle	.50
16-6	Valve Handle Pin	.10
17-6	Push Tube	1.50
18-6	Piston	1.00
19-6	Push Tube Spring	.25
20-6	Large Piston Collar	.15
21-6	Large Hard Piston Packing	.04
22-6	Large Piston Cup Packing	.15
23-6	Large Piston Packing Ring	.15
24-6	Piston Extension	.50
25-6	Small Piston Collar	.15
26-6	Small Hard Piston Packing	.02
27-6	Small Piston Cup Packing	.10
28-6	Small Piston Packing Ring	.15
29-6	Jam Screw	.15
30-6	Pump	4.00
31-6	Pump Pin	.05
32-6	Upper Valve	.10
33-6	Middle Valve	.25
34-6	Lower Valve	.10
35-6	Valve Case	.25
36-6	Valve Bonnet	.15
37-6	Valve Spring	.02
38-6	Pump Retaining Ring	1.00
39-6	Ram Packing	See list page 136
40-6	Ram Packing Ring (upper)	.25
41-6	Ram Packing Ring (lower)	.50
42-6	Bottom Packing	See list page 136
43-6	Bottom Packing Ring	.25
44-6	Handles	1.00
45-6	Straps	1.00
46-6	Handle Bolts	.20
47-6	Lever	See list page 136
48-6	Base Screw	.10
49-6	Arm Screw	.05
50-6	Socket Packing	.04
51-6	Packing Ring Pin	.10
52-6	Cam Pin	.10

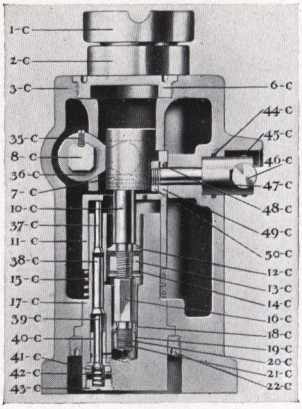


Fig. 612

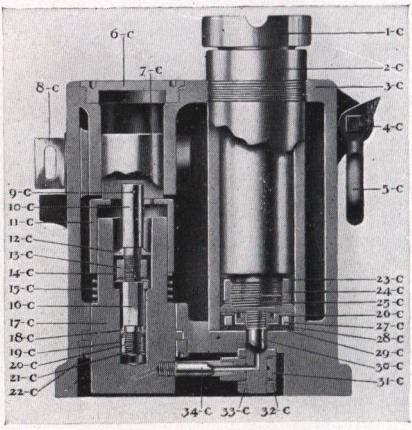


Fig. 613

PRICES OF COMPONENT PARTS OF THE UNIVERSAL CAR INSPECTOR'S JACK

1-C	Ram	See list page 116
2-C	Cylinder	See list page 114
3-C	Cistern	See list page 123
4-C	Handle Bolt	$ .10
5-C	Handle	.50
6-C	Cistern Plate	.50
7-C	Piston Head	1 00
8-C	Socket	3.00
9-C	Piston Retaining Pin	.10
10-C	Piston	.50
11-C	Push Collar	1.00
12-C	Large Piston Collar	.15
13-C	Large Piston Packing Ring	.15
14-C	Large Piston Cup Packing	.15
15-C	Push Collar Spring	.25
16-C	Piston Extension	.50
17-C	Pump	4.00
18-C	Small Piston Collar	.15
19-C	Small Piston Cup Packing	.10
20-C	Small Piston Packing Ring	.15
21-C	Jam Screw	.15
22-C	Pump Retaining Ring	1.00
23-C	Ram Packing	See list page 136
24-C	Ram Packing Ring	1.00
25-C	Ram Packing Jam Plate	1.00
26-C	Cylinder Connection Stud Plate	.50
27-C	Bottom Packing Ring	.25
28-C	Cylinder Connection Stud Washer	.10
29-C	Bottom Packing	See list page 136
30-C	Cylinder Connection Stud	1.00
31-C	Connecting Yoke	1.00
32-C	Connecting Yoke Washer	.10
33-C	Connecting Yoke Nut	.10
34-C	Pump Connection	.50
35-C	Arm Screw	.05
36-C	Arm	1.00
37-C	Upper Valve	.10
38-C	Middle Valve	.25
39-C	Lower Valve	.10
40-C	Valve Case	.25
41-C	Valve Case Bonnet	.15
42-C	Valve Spring	.02
43-C	Pump Bonnet	.15
44-C	Cam Shaft Packing	.02
45-C	Cam Shaft Pin	.10
46-C	Valve Handle	.50
47-C	Cam Shaft	1.00
48-C	Cam Pin	.10
49-C	Cam	.25
50-C	Cam Shaft Nut	.10

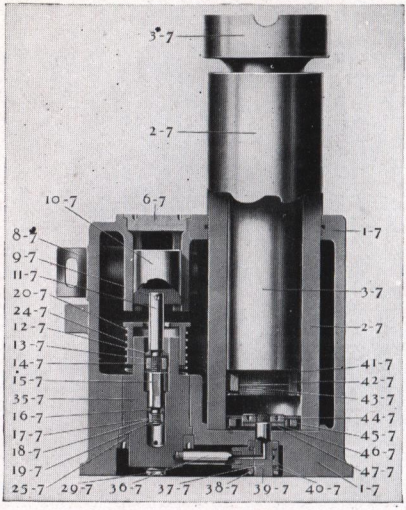


Fig. 614

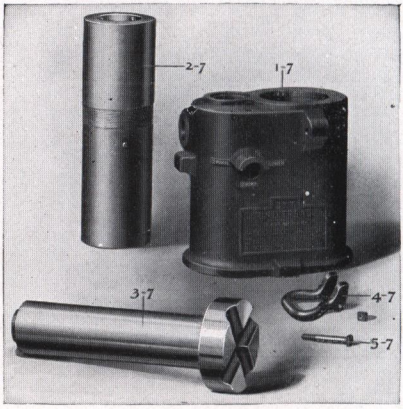


Fig. 615

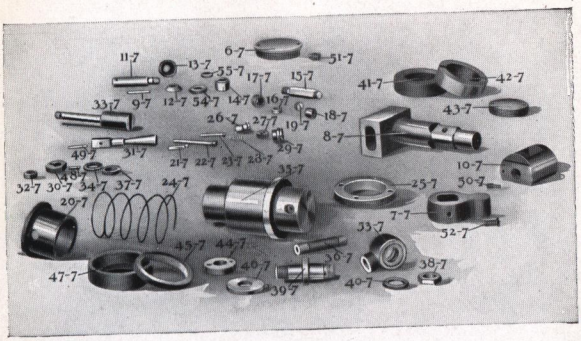


Fig. 616

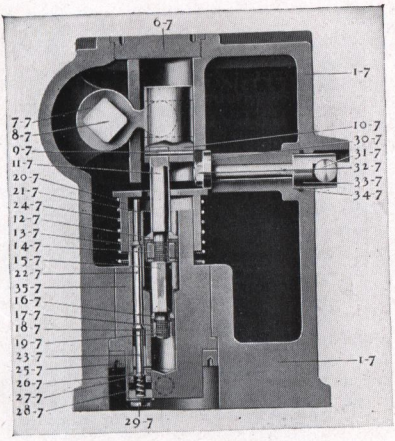


Fig. 617

PRICES OF COMPONENT PARTS OF THE UNIVERSAL HORIZONTAL JACK

6-7	Cistern Plate	$ .50
7-7	Arm	1.00
8-7	Socket	4.00
9-7	Piston Retaining Pin	.10
10-7	Piston Head	1.00
11-7	Piston	.50
12-7	Large Piston Collar	.15
13-7	Large Piston Cup Packing	.15
14-7	Large Piston Packing Ring	.15
15-7	Piston Extension	.50
16-7	Small Piston Collar	.15
17-7	Small Piston Cup Packing	.10
18-7	Small Piston Packing Ring	.15
19-7	Jam Screw	.15
20-7	Push Collar	1.00
21-7	Upper Valve	.10
22-7	Middle Valve	.25
23-7	Lower Valve	.10
24-7	Push Collar Spring	.25
25-7	Pump Retaining Ring	1.00
26-7	Valve Case	.25
27-7	Valve Case Bonnet	.15
28-7	Valve Spring	.02
29-7	Pump Bonnet	.15
30-7	Cam	.25
31-7	Valve Handle	.50
32-7	Cam Shaft Nut	.10
33-7	Cam Shaft	1.00
34-7	Cam Shaft Packing	.02
35-7	Pump	4.00
36-7	Pump Connection	.50
37-7	Connecting Yoke Washer	.10
38-7	Connecting Yoke Nut	.10
39-7	Cylinder Connection Stud	1.00
40-7	Cylnder Connecting Stud Packings	.04
41-7	Ram Packing See list page 136	
42-7	Ram Packing Ring	.50
43-7	Ram Packing Plate	1.00
44-7	Cylinder Connection Stud Plate	.50
45-7	Bottom Packing Ring	.25
46-7	Cylinder Connection Stud Washer	.10
47-7	Bottom Packing See list page 136	
48-7	Cam Pin	.10
49-7	Valve Handle Pin	.10
50-7	Lowering Pin	.15
51-7	Air Valve	.15
52-7	Arm Screw	.05
53-7	Connecting Yoke	1.00
54-7	Large Hard Piston Packing	.04
55-7	Small Hard Piston Packing	.02

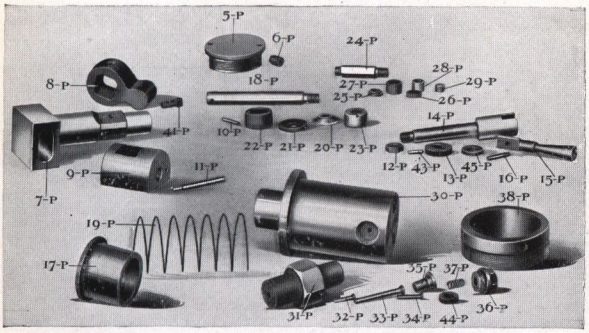


Fig 618

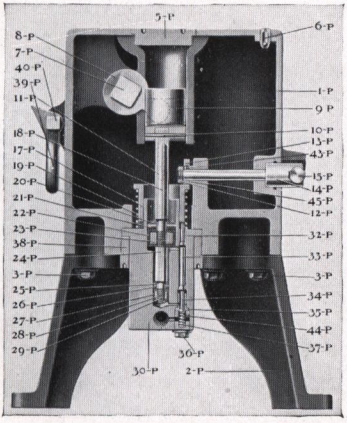


Fig. 619

PRICES OF COMPONENT PARTS OF THE UNIVERSAL DOUBLE PUMP CISTERN PRESSURE PUMP

1-P	Cistern	$15.00
2-P	Legs	each 1.00
3-P	Screws (Leg)	each .10
4-P	Lever	3.00
5-P	Cistern Plate	.50
6-P	Air Valves	.15
7-P	Socket	4 00
8-P	Arm	1.00
9-P	Piston Head	1.00
10-P	Piston Retaining Pin	.10
11-P	Lowering Pin	.15
12-P	Cam Shaft Nut	.10
13-P	Cam	.25
14-P	Cam Shaft	1.00
15-P	Valve Handle	.50
16-P	Valve Handle Pin	.10
17-P	Push Collar	1.00
18-P	Piston	.50
19-P	Push Collar Spring	.25
20-P	Large Piston Collar	.15
21-P	Large Hard Piston Packing	.10
22-P	Large Piston Cup Packing	.25
23-P	Large Piston Packing Ring	.15
24-P	Piston Extension	.50
25-P	Small Piston Collar	.15
26-P	Small Hard Piston Packing	.04
27-P	Small Piston Cup Packing	.10
28-P	Small Piston Packing Ring	.15
29-P	Jam Screw	.15
30-P	Pump	4.00
31-P	Pump Connection	1.00
32-P	Upper Valve	.10
33-P	Middle Valve	.25
34-P	Lower Valve	.10
35-P	Valve Case	.25
36-P	Valve Bonnet	.15
37-P	Valve Spring	.02
38-P	Pump Retaining Ring	1.00
39-P	Handles	1.00
40-P	Handle Bolts	.20
41-P	Arm Screw	.05
42-P	Socket Packing	.04
43-P	Cam Pin	.10
44-P	Valve Case Bonnet	.15
45-P	Cam Washer	.10

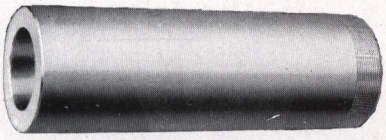


Fig. 620

PRICES OF CYLINDERS FOR THE UNIVERSAL HYDRAULIC DOUBLE PUMP PLAIN JACK, SHOWN ON PAGE 36

No. of Part	No. of Jack	Lift Tons	Run Out Inches	Price Each	Code
10051	580	10	12	$10.00	Abaca
10052	581	10	18	15.00	Abacist
10053	582	10	24	20.00	Abalone
10056	583	15	12	12.00	Abderian
10057	584	15	18	18.00	Abele
10058	585	15	24	24.00	Abelmosk
10061	586	20	12	14.00	Abiding
10062	587	20	18	21.00	Abisme
10063	588	20	24	28.00	Abjure
10066	589	30	9	15.00	Ablaque
10067	590	30	12	18.00	Ablegate
10068	591	30	18	27.00	Ablude
10071	592	40	12	24.00	Abric
10072	593	40	18	34.00	Abroma
10076	594	50	12	28.00	Abuta
10077	595	50	18	40.00	Abutilon
10081	596	60	12	40.00	Abvolate

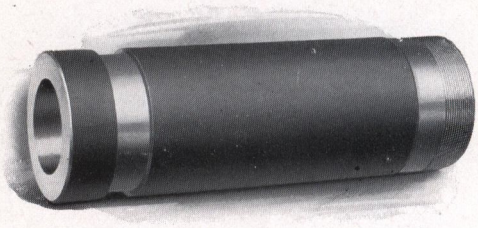


Fig. 621

PRICES OF CYLINDERS FOR THE UNIVERSAL HYDRAULIC DOUBLE PUMP RAILROAD JACK, SHOWN ON PAGE 37

No. of Part	No. of Jack	Lift Tons	Run Out Inches	Price Each	Code
10106	597	10	12	$10.00	Academic
10107	598	10	18	15.00	Acadian
10108	599	10	24	20.00	Acajoin
10111	600	15	12	12.00	Acaleph
10112	601	15	18	18.00	Acanthion
10113	602	15	24	24.00	Acanthus
10116	603	20	12	14.00	Acara
10117	604	20	18	21.00	Acclamation
10118	605	20	24	28.00	Accoast
10121	606	30	9	15 00	Accolade
10122	607	30	12	18.00	Accon
10123	608	30	18	27.00	Accourage
10126	609	40	12	24.00	Accresent
10127	610	40	18	34.00	Accrete
10131	611	50	12	28 00	Acemetic
10132	612	50	18	40.00	Aceride
10136	613	60	12	40.00	Acerose

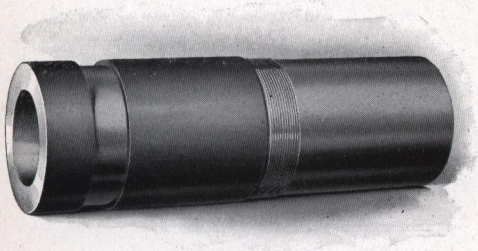


Fig. 622

PRICES OF CYLINDERS FOR THE UNIVERSAL HYDRAULIC DOUBLE PUMP BASE JACK, SHOWN ON PAGE 38

No. of Part	No. of Jack	Lift Tons	Run Out Inches	Price Each	Code
10161	614	10	12	$10.00	Achania
10162	615	10	18	15.00	Achean
10166	616	15	12	12.00	Achime
10167	617	15	18	18.00	Achira
10171	618	20	12	14.00	Achroite
10172	619	20	18	21.00	Acnode
10176	620	30	9	15 00	Acquiesce
10177	621	30	12	18 00	Acryl
10178	622	30	18	27.00	Acto
10181	623	40	12	24.00	Acuminate
10182	624	40	18	34.00	Acuteness
10186	625	50	12	28 00	Adapter
10187	626	50	18	40.00	Adarcon
10191	627	60	12	40.00	Adaunt

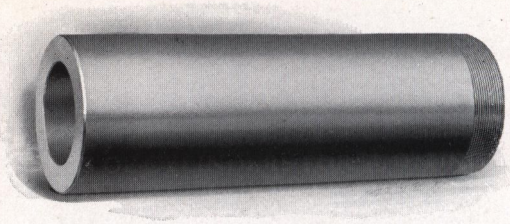


Fig. 623

PRICES OF CYLINDERS FOR THE UNIVERSAL HYDRAULIC DOUBLE PUMP CLAW JACK, SHOWN ON PAGE 39

No. of Part	No. of Jack	Lift Tons	Run Out Inches	Price Each	Code
10216	629A	10	12	$10.00	Adaptness
10217	629B	10	18	15.00	Adinole
10221	629C	15	12	12.00	Adjutor
10222	629D	15	18	18.00	Admonish
10226	629E	20	12	14.00	Admonitor
10227	629F	20	18	21.00	Adonide
10231	630	30	9	15.00	Adoxa
10232	631	30	12	18.00	Adras
10233	632	30	18	27.00	Adroitness
10236	633	40	12	24.00	Aerolite
10237	634	40	18	34.00	Affable
10241	635	50	12	28.00	Affluence

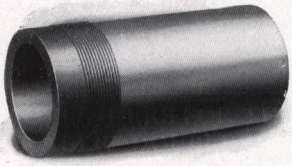


Fig. 624

PRICES OF CYLINDERS FOR THE UNIVERSAL HYDRAULIC DOUBLE PUMP CAR INSPECTOR'S JACK, SHOWN ON PAGE 54

No. of Part	No. of Jack	Lift Tons	Run Out Inches	Price Each	Code
10491	680	7	5	$6.00	Albatross
10496	681	10	5	7.00	Albedo
10501	682	15	5	8.00	Albene
10506	683	20	5	10.00	Albertite
10511	684	25	5	12.00	Albescent
10516	685	30	5	14.00	Albirco

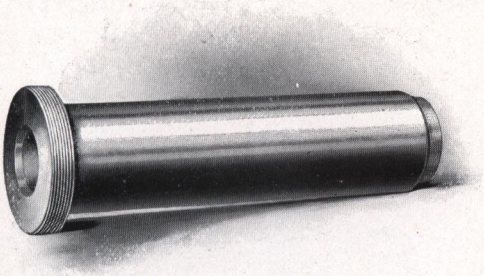


Fig. 625

PRICES OF RAMS FOR THE UNIVERSAL HYDRAULIC DOUBLE PUMP JACKS SHOWN ON PAGES 36, 37, 38 AND 39

No. of Part	Lift Tons	Run Out Inches	Price Each	Code
12051	10	12	$10 00	Aftaba
12052	10	18	15.00	Agalma
12053	10	24	20.00	Agile
12056	15	12	12.00	Agility
12057	15	18	18.00	Agora
12058	15	24	24.00	Agral
12061	20	12	14 00	Agrarian
12062	20	18	21 00	Aignille
12063	20	24	28 00	Ailette
12066	30	9	15 00	Akala
12067	30	12	18.00	Akebia
12068	30	18	27 00	Alacrity
12071	40	12	24 00	Aladdin
12072	40	18	34 00	Alamo
12076	50	12	28 00	Alaria
12077	50	18	40 00	Alban
12081	60	12	40.00	Albata

PRICES OF RAMS FOR THE UNIVERSAL DOUBLE PUMP CAR INSPECTOR'S JACK, SHOWN ON PAGE 54

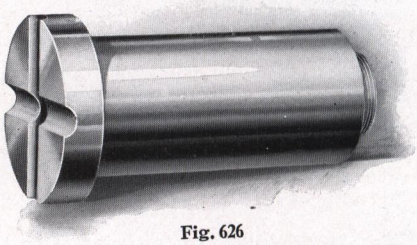


Fig. 626

No. of Part	No. of Jack	Lift Tons	Run Out Inches	Price Each	Code
12491	680	7	5	$5.00	Alcaide
12496	681	10	5	6.00	Alcazar
12501	682	15	5	7.00	Alcoid
12506	683	20	5	9.00	Alcyone
12511	684	25	5	11.00	Aldane
12516	685	30	5	13.00	Aldebaran

PRICES OF HEADS FOR THE UNIVERSAL HYDRAULIC DOUBLE PUMP PLAIN AND BASE JACKS

Fig. 627

No. of Part	Lift Tons	Run Out Inches	Price Each	Code
14051	10	12	$4.00	Aluta
14052	10	18	4.00	Alvis
14053	10	24	4.00	Amaltas
14056	15	12	4.00	Amaracus
14057	15	18	4.00	Amaranth
14058	15	24	4 00	Amaryllis
14061	20	12	4.00	Amazement
14062	20	18	4.00	Ambrite
14063	20	24	4.00	Amenity
14066	30	9	5.00	Amidine
14067	30	12	5.00	Amidol
14068	30	18	5.00	Amparo
14071	40	12	6.00	Ampelite
14072	40	18	6.00	Amphora
14076	50	12	7.50	Amplify
14077	50	18	7.50	Amplitude
14081	60	12	8.00	Amrita

PRICES OF HEADS FOR THE UNIVERSAL HYDRAULIC DOUBLE PUMP CLAW JACK, SHOWN ON PAGE 39

Fig. 628

No. of Part	No. of Jack	Lift Tons	Run Out Inches	Price Each	Code
14216	629A	10	12	$4.00	Chlanis
14217	629B	10	18	4.00	Choca
14221	629C	15	12	4.00	Choral
14222	629D	15	18	4.00	Chorda
14226	629E	20	12	4.00	Chouan
14227	629F	20	18	4.00	Chovy
14231	630	30	9	5.00	Chroma
14232	631	30	12	5.00	Chromite
14233	632	30	18	5.00	Chudi
14236	633	40	12	6.00	Chulan
14237	634	40	18	6.00	Chymod
14241	635	50	12	7.50	Cibol

PRICES OF HEADS FOR THE UNIVERSAL HYDRAULIC DOUBLE PUMP RAILROAD JACK WITH REMOVABLE CLAW SHOWN ON PAGE 41

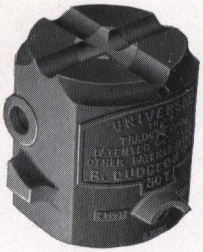


Fig. 629

No. of Part	No. of Jack	Lift Tons	Run Out Inches	Price Each	Code
14266	639A	10	12	$4.00	Cicely
14267	639B	10	18	4.00	Cidaris
14271	639C	15	12	4.00	Cimier
14272	639D	15	18	4.00	Cimolite
14276	639E	20	12	4.00	Circar
14277	639F	20	18	4.00	Cirque
14281	640	30	9	5.00	Cisco
14282	641	30	12	5.00	Citole
14283	642	30	18	5.00	Citril
14286	643	40	12	6.00	Clarine
14287	644	40	18	6.00	Clarite
14291	645	50	12	7.50	Clement
14292	646	50	18	7.50	Clyve
14296	647	60	12	8.00	Coala

PRICES OF BOTTOMS FOR THE UNIVERSAL HYDRAULIC DOUBLE PUMP JACKS SHOWN ON PAGES 36, 39 AND 40

Fig 630
Round Bottom

Fig. 631
Square Bottom

Specify whether round or square bottom is required.

No of Part	Lift Tons	Run Out Inches	Price Each	Code
15051	10	12	$2.00	Amusette
15052	10	18	2.00	Amylin
15053	10	24	2.00	Amzel
15056	15	12	2.50	Analect
15057	15	18	2.50	Anamirta
15058	15	24	2.50	Anchoret
15061	20	12	3.00	Ancyrene
15062	20	18	3.00	Andesite
15063	20	24	3.00	Angelica
15066	30	9	4.00	Animate
15067	30	12	4.00	Animation
15068	30	18	4.00	Annatto
15071	40	12	5.00	Anthela
15072	40	18	5.00	Anthemion
15076	50	12	6.00	Antinion
15077	50	18	6.00	Aperse
15081	60	12	6.00	Apheta

PRICES OF RAILROAD BASES FOR THE UNIVERSAL HYDRAULIC DOUBLE PUMP RAILROAD JACK SHOWN ON PAGE 37

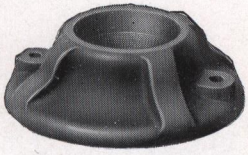


Fig. 632

No. of Part	No. of Jack	Lift Tons	Run Out Inches	Price Each	Code
16051	597	10	12	$3.00	Aphrodite
16052	598	10	18	3.00	Aporia
16053	599	10	24	3 00	Appanage
16056	600	15	12	4 00	Applause
16057	601	15	18	4.00	Applique
16058	602	15	24	4.00	Approbation
16061	603	20	12	5.00	Apsidal
16062	604	20	18	5.00	Aptera
16063	605	20	24	5 00	Apteryx
16066	606	30	9	6.00	Aptness
16067	607	30	12	6.00	Aquilla
16068	608	30	18	6.00	Aragonite
16071	609	40	12	7 00	Aralia
16072	610	40	18	7 00	Aramean
16076	611	50	12	8.00	Arango
16077	612	50	18	8.00	Arbalest
16081	613	60	12	9.00	Arboreal

PRICES OF BASES FOR THE UNIVERSAL HYDRAULIC DOUBLE PUMP BASE JACK, SHOWN ON PAGE 38

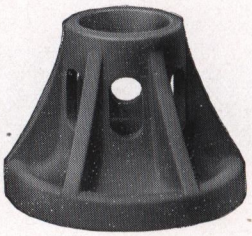


Fig. 633

No. of Part	No. of Jack	Lift Tons	Run Out Inches	Price Each	Code
17051	614	10	12	$3.50	Arboresce
17052	615	10	18	3.50	Arboret
17056	616	15	12	4.50	Archimage
17057	617	15	18	4.50	Archivist
17061	618	20	12	6.00	Archlute
17062	619	20	18	6.00	Archon
17066	620	30	9	7.50	Arcturus
17067	621	30	12	7.50	Arculum
17068	622	30	18	7.50	Arcus
17071	623	40	12	8.50	Ardassive
17072	624	40	18	8.50	Areca
17076	625	50	12	9.00	Arenaria
17077	626	50	18	9.00	Areola
17081	627	60	12	10.00	Argand

PRICES OF CISTERNS FOR THE UNIVERSAL HYDRAULIC DOUBLE PUMP CAR INSPECTOR'S JACK, SHOWN ON PAGE 54

No. of Part	No. of Jack	Lift Tons	Run Out Inches	Price Each	Code
18051	680	7	5	$10.00	Argentate
18056	681	10	5	12.00	Argus
18061	682	15	5	14.00	Aristocrat
18066	683	20	5	16.00	Armilla
18071	684	25	5	18.00	Armistice
18076	685	30	5	20.00	Aroma

PRICES OF CLAWS FOR THE UNIVERSAL HYDRAULIC DOUBLE PUMP RAILROAD JACK WITH REMOVABLE CLAW SHOWN ON PAGE 41

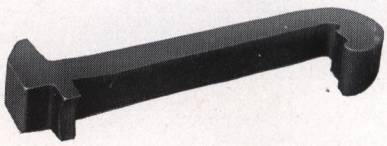


Fig. 634

No. of Part	No. of Jack	Lift Tons	Run Out Inches	Price Each	Code
19101	639A	10	12		Corbana
19102	639B	10	18		Cordelle
19106	639C	15	12		Cordon
19107	639D	15	18		Corella
19111	639E	20	12		Cornac
19112	639F	20	18		Corno
19116	640	30	9		Corozo
19117	641	30	12		Corvan
19118	642	30	18		Cosaque
19121	643	40	12		Coteau
19122	644	40	18		Cotinga
19126	645	50	12		Courlan
19127	646	50	18		Cozari
19131	647	60	12		Craig

PRICES OF CLAWS FOR THE UNIVERSAL HORIZONTAL HYDRAULIC DOUBLE PUMP JACK WITH REMOVABLE CLAW, SHOWN ON PAGES 55 AND 56

Fig. 635

No. of Part	No. of Jack	Lift Tons	Run Out Inches	Price Each	Code
19156	720	10	12	$10.00	Crambo
19157	721	10	18	15.00	Crannog
19161	722	15	12	25.00	Crax
19162	723	15	18	30.00	Credent
19166	724	20	12	35.00	Crenel
19167	725	20	18	40.00	Cresol
19171	726	30	12	40.00	Crespine
19172	727	30	18	50.00	Crevet
19176	728	40	12	50.00	Crinet
19177	729	40	18	60.00	Crista

TOOLS FOR REPAIRING THE UNIVERSAL HYDRAULIC JACK

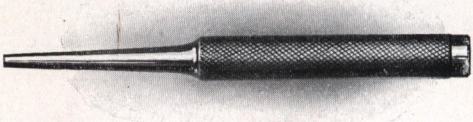


Fig. 636
Pin Drift, price 50 cents each
Code: Cephal

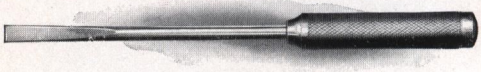


Fig. 637
Valve Grinder, price 65 cents each
Code: Cepheus

Fig. 638
Small Valve Seat Set, price 50 cents each
Code: Cepphi

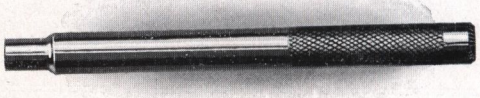


Fig. 639
Large Valve Seat Set, price 50 cents each
Code: Ceptre

Discounts .....

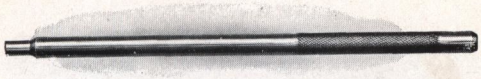


Fig. 640

Long Valve Seat Set, price 65 cents each

Code: Cerago

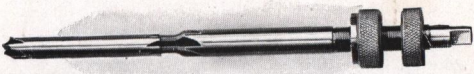


Fig. 641

Valve Seat Reamer, with Micrometer Adjustment price $1.50 each

Code: Cerain

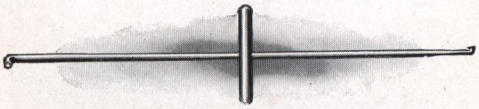


Fig. 642

Extractor, price 25 cents each

Code: Ceast

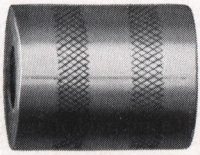


Fig. 643

Valve case holder, price 30 cents each

Code: Cebida

Discounts .....

Fig. 644
Drift, price 50 cents each
Code: Ceboo

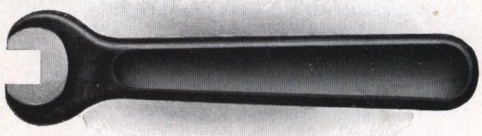


Fig. 645
Wrench for arm screw, price each
Code: Cedrus

Fig. 646
Wrench for pressure pumps; for screws for base and cover, price each
Code: Ceiba

Fig. 647
Wrench for gland and nipple for pressure pumps, price each
Code: Cedula

Discounts.....

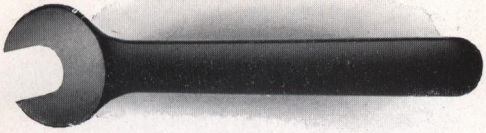


Fig. 648

Wrench for cam shaft nut, single piston, price each

Code: Cedilla

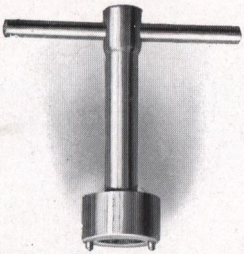


Fig. 649

Socket wrench for cam shaft bearings, price each

Code: Cedrate

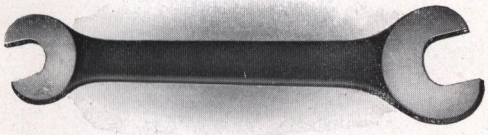


Fig. 650

Wrench for piston extension and cam shaft nut, also all ram packing bolts, price each

Code: Cedrene

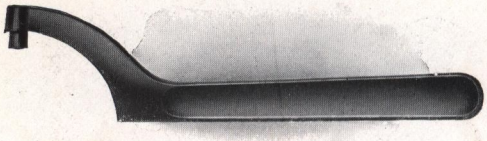


Fig. 651

Spanner, price each

Code: Ceboid

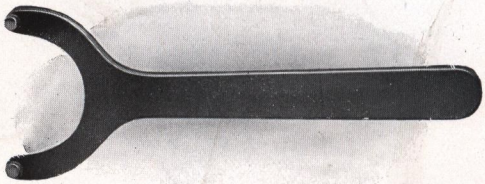


Fig. 652

Spanner wrench, price 75 cents each

Code: Cecils

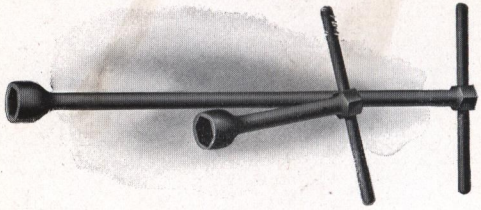


Fig. 653

Cylinder connection stud plate wrenches, price each

Code: Cedarn

Discounts.....

JACK ERECTING VISE

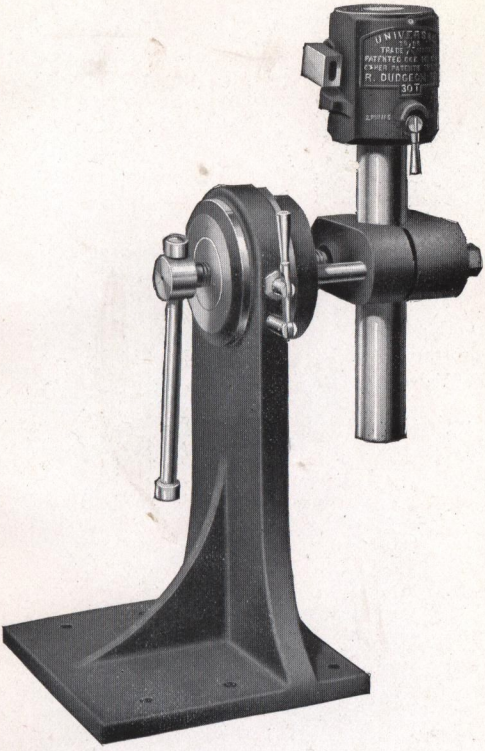


Fig. 654

Vise to be used in repairing and erecting hydraulic jacks of every type. By means of this vise and suitable wrenches all types of hydraulic jacks may be taken apart and reassembled more easily than by the use of any other vise on the market. The work may be revolved and locked in a position most convenient to the operator. Price on application.

Height of vise to center of screw, 26 inches.

Height of vise over all, 32 inches.

Size of base, 1 foot 9 inches by 2 feet.

Weight, 500 pounds.

Shipping weight, 600 pounds.

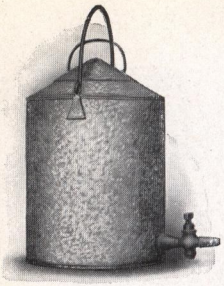


Fig. 655

Galvanized iron can, to be used as reservoir with portable hydraulic pumps.

Code: Cellite

High-pressure Hydrostatic Relief Valve

Code: Celsity

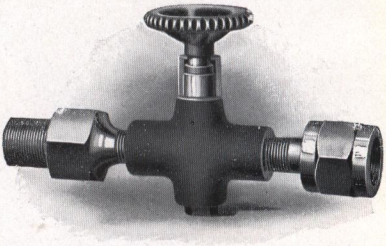


Fig. 656

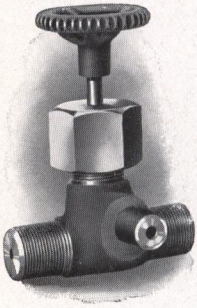


Fig. 657

High-pressure Hydrostatic Controlling Valve

Code: Celure

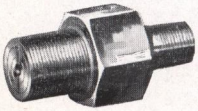


Fig. 658

Hydrostatic Nipple
1¼ x ½ inches
Code: Cembra

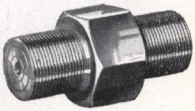


Fig. 659

Hydrostatic Nipple
1¼ x 1¼ inches
Code: Censo

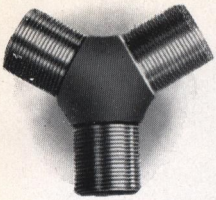


Fig. 660
Hydrostatic
Two-way Connection
Code: Centavo

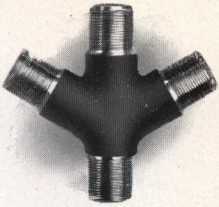


Fig. 661
Hydrostatic
Three-way Connection
Code: Centena

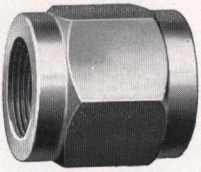


Fig. 662
Straight Connection Coupling Nut
Code: Centime

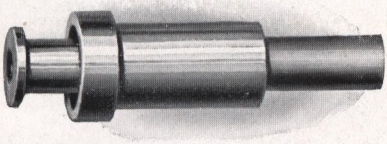


Fig. 663
Copper Pipe Coupling
Plain Thimble and Flanged Pipe
Code: Centra

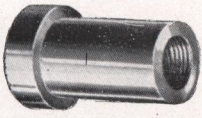


Fig. 664
Thimble used in Copper Pipe Coupling, shown by Fig. 665
Code: Centesm

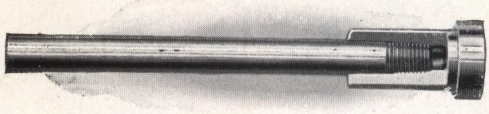


Fig. 665

Copper Pipe Coupling
Threaded Thimble and Pipe
Thimble cut away to show threads
Code: Centuria

FLEXIBLE COPPER PIPE FOR HYDRAULIC CONNECTIONS

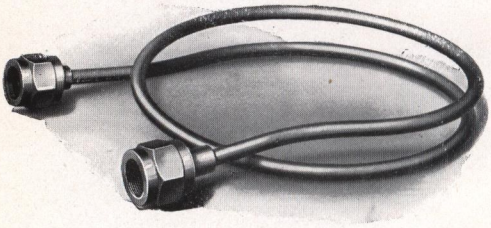


Fig. 666

Number	Length Feet	Price per Length Including Couplings	Code
1	4	$11.00	Cerberus
2	5	11.50	Cercle
3	6	12.00	Ceresin
4	7	12.50	Cereus
5	8	13.00	Cerevis
6	9	13.50	Cerin
7	10	14.00	Ceriph
8	11	14.50	Cerise
9	12	15.00	Cerium

Pipe ends may be had either flanged or threaded as shown by two preceding cuts, as may be desired.

PRICES OF RAM AND BOTTOM PACKINGS

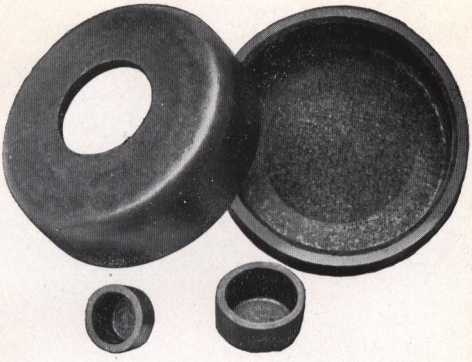


Fig. 667

PRICES OF RAM PACKINGS

Tons	Price	Code
10	$0.45	Artful
15	.55	Artist
20	.60	Arundo
30	.75	Arzun
40	.85	Ashler
50	.85	Asmanite
60	.85	Asoka
80	1.00	Aspiration
90	1.25	Asteroid
100	1.25	Astraleon
125	1.50	Astrean
150	1.75	Astute

PRICES OF BOTTOM PACKINGS

Tons	Price	Code
10	$0.45	Cerne
15	.55	Cero
20	.60	Ceroma
30	.75	Cerotene
40	.85	Cerris
50	.85	Certie
60	.85	Certosa
80	1.00	Ceruse
90	1.25	Ceryl
100	1.25	Cesare
125	1.50	Chabot
150	1.75	Chacma

PRICES OF RAM PACKINGS FOR UNIVERSAL JACKS

Tons	Price	Code
10	$0 45	Cabin
15	.55	Campaign
20	.60	Camp
30	.75	Captive
40	.85	Caravan
50	1 00	Carmine
60	1 25	Castenet
80	1.50	Cater
100	1.75	Chaco
125	2.00	Chacoid
150	3.00	Chacuru

PRICES OF BOTTOM PACKINGS FOR UNIVERSAL JACKS

Tons	Price	Code
10	$0.45	Chafern
15	.55	Chaja
20	.60	Chakra
30	.75	Chalco
40	.85	Chalder
50	1.00	Chalet
60	1.25	Challis
80	1 50	Chamar
100	1.75	Chambrel
125	2 00	Chamoy
150	3.00	Chanda

CUP PISTON PACKINGS

Large Cup Piston Packings	$ .20
Small Cup Piston Packings	.15

PRICES OF LEVERS FOR HYDRAULIC JACKS

Levers for Car Inspector's Jack	$2 00
Levers for Jacks from 4 to 20 tons capacity	2.00
Levers for Jacks of 30 tons and larger capacity	3 50
Levers for Hydraulic Punches	3.50

The following is a copy of a letter which appeared in the "Railway Age Gazette" of December 1st, 1911

ATLANTIC CITY, N. J., November 24, 1911

To the Editor of the "Railway Age Gazette":

There is no tool in an engine house that is more useful, does harder work, and gets cussed more than the hydraulic jack. If Job had worked in an engine house and had had a rush job requiring a jack, and after dragging it from the tool room and putting it in place under an engine, incidentally bruising a knuckle and having a few drops of hot water drop down the back of his neck, and then found that the jack would not work, he would never have made a reputation for patience. Instead he might have been convicted for manslaughter, if he had met the last man that used the jack at just about that time. Now, the jack probably did work good for the man that had used it before, and when it is taken apart nothing may be found wrong with it. In nearly every case of this kind the trouble is due to dirt or some foreign substance in the jack. If the proper precautions were taken with the jack liquid and in filling the jack, about one-half of the trouble would disappear. Did you ever see men filling a jack away from the tool room? Their hands may be thick with grease and grit, and the head of the jack may be in the same condition; as the filling plug is loosened the grease and dirt pile up around it and as soon as it comes out the dirt drops in. The liquid is then poured in, often without a funnel. The result is that some of the liquid spills alongside of the hole and washes the dirt in with it. I have also seen men overhauling a jack pour the dirty liquid out in a bucket, and after washing out the jack barrel, renewing the leathers and grinding in or renewing the valves, carefully pour back the dirty liquid. The dirt cuts the barrel, leathers and valves and a minute particle of it under a valve will render the jack inoperative.

All this trouble could be avoided if the jack liquid were carefully strained through a funnel having a very fine screen when the jack was being filled. The head of the jack around the filling plug hole should be carefully cleaned before the plug is taken out and the person handling the plug should have his hands clean of loose dirt and grit. Another bad practice is to wipe out the jack barrel with cotton waste when it is being overhauled. The lint of the waste sticks to the side of the barrel and when the jack is put to work it is liable to get under a valve and cause trouble. Such bad practices as leaving jacks in the pit, allowing them to lie lengthwise after being used, and filling them with water, kerosene or any other available liquid are too well known to require special attention being called to them.

(Signed) CHARLES MAIER.*

* Mr. Maier is Engine House Foreman of the West Jersey & Seashore Railroad at Atlantic City, N. J.

THE word "Universal" has been registered in the United States Patent Office by Richard Dudgeon, as a trade-mark for hydraulic jacks, punches and other hydraulic appliances containing superimposed valves. It is unlawful to sell or offer for sale any hydraulic appliances under this name, whether containing this system of valves or not, and whether marked with this label or not, or to apply to such appliances, either by writing, printing or word of mouth, any word resembling this trade-mark.

The Universal system of valves and valve control and jacks and pumps made with this system are fully protected by letters patent in the United States and foreign countries, and all infringement of the rights granted by these patents will be subject to prosecution.

United States patents covering the Universal system of valves and valve control have been granted on the following dates:

October 16, 1906
October 15, 1907
December 24, 1907
August 11, 1908
September 22, 1908
November 24, 1908
January 12. 1909
March 2, 1909
October 5, 1909
November 9, 1909
November 23, 1909
December 7, 1909

NOTE—As new forms or types of jacks and pumps are continually being made, of which descriptive circulars will be printed, it is suggested that those interested send their names to the address below, and as these circulars are issued from time to time copies will be mailed to them.

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